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UNDER SEAL PAGES 2438 - 2449

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

Before The Honorable YVONNE GONZALEZ ROGERS, Judge

EPIC GAMES, INC.,)	
)	
Plaintiff,)	NO. C-20-5640 YGR
)	
vs.)	Friday, May 14, 2021
)	
APPLE, INC.,)	Oakland, California
)	
Defendant.)	BENCH TRIAL
)	
APPLE, INC.,)	
)	
Counterclaimant,)	
vs.)	
)	
EPIC GAMES, Inc.,)	
)	
Counter-Defendant.)	
)	

REPORTER'S TRANSCRIPT OF PROCEEDINGS

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TRANSCRIPT PRODUCED BY COMPUTER-AIDED TRANSCRIPTION

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1 FRIDAY, MAY 14, 2021

8:00 a.m.

2 P R O C E E D I N G S

3 **THE CLERK:** Calling CV 20-5640, Epic Games, Inc., vs.
4 Apple, Inc.

5 Counsel, please state your appearances. The mics on the
6 table are on.

7 **MS. FORREST:** Good morning, Your Honor. Katherine
8 Forrest for Epic.

9 **THE COURT:** Good morning.

10 **MR. BORNSTEIN:** Good morning. Gary Bornstein for
11 Epic.

12 **THE COURT:** Mr. Bornstein, good morning.

13 **MR. EVEN:** Good morning, Your Honor. Yonatan Even
14 for Epic.

15 **THE COURT:** Good morning.

16 **MR. GRANT:** Good morning, Your Honor. Michael Grant
17 for Epic.

18 **THE COURT:** Okay. This is a new face. Welcome to
19 the courtroom, Mr. Grant.

20 **MR. GRANT:** Thank you, Your Honor.

21 **MR. NIU:** Good morning, Your Honor. Jin Niu for
22 Epic.

23 **MS. COSCIA:** Good morning, Your Honor. Monica Coscia
24 for Epic.

25 **THE COURT:** Good morning, Ms. Coscia.

1 Mr. Sweeney, good morning.

2 **MR. SWEENEY:** Good morning, Your Honor.

3 **THE COURT:** And Mr. Rudd, good morning, sir.

4 **MR. RUDD:** Good morning.

5 **THE COURT:** Okay. And on the Apple side.

6 **MR. DOREN:** Good morning, Your Honor. Richard Doren
7 for Apple, and we are joined today again by Heather Grenier,
8 head of commercial litigation, and Jen Brown, in-house counsel
9 for Apple.

10 **MR. BROWN:** Good morning, Your Honor.

11 **THE COURT:** I'm sorry. Ms. Brown, your first name
12 again?

13 **MR. BROWN:** Jen.

14 **THE COURT:** Jen Brown. Okay.

15 **MR. SWANSON:** Good morning, Your Honor. Dan Swanson
16 for Apple.

17 **THE COURT:** Good morning, Mr. Swanson.

18 **MR. KLEINBRODT:** Good morning, Your Honor. Julian
19 Kleinbrodt for Apple.

20 **THE COURT:** Good morning.

21 And then we have Mr. Eltiste. Yes. Good morning.

22 **MR. ELTISTE:** Good morning.

23 **THE COURT:** I see in the back Ms. Lawyer.

24 **MS. LAWYER:** Good morning, Your Honor.

25 **THE COURT:** Good morning. And I see Ms. Richman.

1 Good morning.

2 **MS. RICHMAN:** Good morning, Your Honor.

3 **THE COURT:** On the -- in the gallery then -- it's
4 Friday, so we have Mr. Siegel from the plaintiffs' class
5 action.

6 **MR. SIEGEL:** Good morning, Your Honor.

7 **THE COURT:** Good morning, sir. Then in the pool
8 reporters we have Paresh Dave from *Reuters*; is that right?

9 **MR. DAVE:** That's right. Good morning.

10 **THE COURT:** And Michael Acton from *MLex*.

11 **MR. ACTON:** Good morning, Your Honor.

12 **THE COURT:** Good morning. Okay.

13 As always, let's go ahead and start.

14 Ms. Forrest, anything to discuss on your to-do list?

15 **MS. FORREST:** Yes, Your Honor.

16 **THE CLERK:** Hold on. Let me get the mics on.

17 Okay. Both the podium mics are on.

18 **MS. FORREST:** Yes, Your Honor. Mr. Doren and I have
19 conferred on a couple of these that we have some positions
20 that are respective to our clients. First we wanted to
21 re-raise the issue of closing statements because we've got
22 Friday, and the weekend would be an appropriate time for us to
23 prepare if we are going to do such a thing. And we would like
24 to hold aside from our time one hour to do that and to do that
25 immediately at the close of the evidence. We would be

1 prepared to proceed. So whenever that happens, we would be
2 prepared immediately to have a closing. We think it would be
3 very helpful to put the evidence against the law and to lay it
4 all out.

5 **THE COURT:** How is that any different from
6 anything -- I mean, you all have submitted so much
7 information, and I did review your Findings of Fact and
8 Conclusions of Law, at least, you know, one of the versions.
9 And you believe that you have proven your case. I mean,
10 there's very little in there that's -- that is struck out, so
11 to speak.

12 So nothing's really changed. I've heard it -- you know, I
13 heard your opening, I've read your briefing, I've read the
14 hundreds of pages. So perhaps for the public you want to do
15 this? I just don't know how it's going to be any different.

16 **MS. FORREST:** All right. And so if I may,
17 Your Honor, it's almost because of the volume of material that
18 we have and that Your Honor has had to grapple with. It's a
19 very complicated case. As Your Honor had suggested the other
20 day, some of the case law in terms of how to prove market
21 definition are things that could stand to be laid out.

22 We think that a one-hour concise recitation of some
23 highlighted points, particularly some of those that have come
24 up during the trial and received particular focus, would be of
25 great use.

1 We are not asking for any additional time. We would take
2 it out of the time that we, you know, have allotted, but we do
3 think it would help to focus on some particular points.

4 **THE COURT:** Let me hear from Mr. Doren, and then I
5 have some other thoughts. I have been thinking about this
6 over the last few days.

7 Go ahead, Mr. Doren.

8 **MR. DOREN:** Thank you, Your Honor.

9 As we understand the Court's past practice or usual
10 practice, we would submit the findings of fact, provide any
11 post-trial briefing that the Court requests, and if the Court
12 thinks after that that a closing would be helpful, then we
13 could -- we could appear before the Court and provide closings
14 on the topics this Court wishes to address further. But we
15 think there is no reason to depart from that process on this
16 particular case, and we do -- we agree with the Court that you
17 have many -- many summary documents in front of you and will
18 have more before we're through.

19 **THE COURT:** So here are my other thoughts.

20 What would be most helpful and what I think what you are
21 probably not interested in doing, Ms. Forrest, is that what I
22 do in my patent cases for *Markmans* -- do any of your lawyers
23 practice patent law?

24 (Ms. Forrest raised her hand.)

25 **THE COURT:** Okay. So what I do in my *Markmans* is for

1 every term that the lawyers are disputing, we have a -- both
2 lawyers are up here, and we go back and forth, so it's more
3 like a debate than it is -- and people now know they do not
4 prepare decks or if they do prepare decks, then they give me
5 the decks, and we never really kind of get through them
6 because I take each issue and each side gets to go back and
7 forth, and they answer my questions and they respond to each
8 other.

9 Here's the problem in this case. Your experts upon which
10 much of antitrust law is based, right, they talk past each
11 other frequently. They have very different views of what the
12 market definition is. They make assumptions that they
13 sometimes respond to and other times do not. So it's -- until
14 I have a chance to go back and really assemble and reassemble
15 and look at all this evidence, another single presentation
16 doesn't really help me.

17 Now, if the two of you are willing to stand up there and
18 go through each of these elements and debate them out, that I
19 would find helpful just like I find that kind of approach
20 helpful with my *Markmans*.

21 **MS. FORREST:** We would be prepared to do that,
22 Your Honor. If Your Honor would like to give us a -- we can
23 go through all of the elements that have to be proven and do
24 it as a point/counterpoint or to do particular ones that
25 Your Honor might find helpful and sort of -- not necessarily

1 all of them, but some of them. We would be fully amenable to
2 that kind of approach.

3 **MR. DOREN:** Certainly fine with us, Your Honor. Just
4 a matter of timing and when it would be most convenient for
5 the Court.

6 **THE COURT:** Okay. Well, I would find that to be
7 helpful. What I would suggest that we do is -- it doesn't
8 seem to me that anybody really disputes the approach, the
9 legal approach that I took with respect to the preliminary
10 injunction order, right, just in terms of the framework?

11 **MS. FORREST:** In terms of the framework, Your Honor,
12 no.

13 **MR. DOREN:** True, Your Honor. Correct.

14 **THE COURT:** So if we took -- just so that you each
15 again have a shared framework, we could go back to that
16 framework, the legal framework, and work through it in that
17 way, unless you want to -- you can all meet and confer. I
18 mean, the elements are the elements. The considerations are
19 the considerations. And I thought -- certainly when I was
20 thinking about it in terms of that order, I tried to outline
21 the issues, and I couldn't -- I couldn't get from you a shared
22 view when I asked you to outline the elements. Some of the
23 things you agreed on, some of them you didn't. But if -- so
24 if you cannot agree, that is what I would use myself in having
25 you go through it, and then, again, just like in -- just like

1 I do in my patent cases, you obviously know what the issues
2 are, and so if you have your hot-seat operators able to move
3 quickly to PowerPoints, we can switch back and forth, that's
4 fine. We can use the ELMO. You can put things right on the
5 ELMO.

6 That kind of approach at the end I would find helpful
7 because that's what I need to do. There's a lot of evidence,
8 and as I started going back through that, you know, the Ninth
9 Circuit's case in *Qualcomm* teaches that these are intensely
10 factual issues.

11 One of the reasons that I have allowed you to have so much
12 evidence in the record is because these are important cases,
13 and it is those factual issues that are going to drive my
14 decision and to drive any decision of any appellate court.
15 Without the factual evidence in the record, we can't do that.

16 **MR. DOREN:** And, Your Honor --

17 **MS. FORREST:** Your Honor --

18 **THE COURT:** Go ahead, Ms. Forrest.

19 **MS. FORREST:** One thing, Your Honor, just in terms of
20 the preliminary injunction -- and I think we are all aware of
21 it -- that was not on the entirety of the case; it was on the
22 limited issues that were before the Court at that time. And
23 obviously it's --

24 **THE COURT:** Sure.

25 **MS. FORREST:** -- additional claims and evidence out

1 here.

2 **THE COURT:** True. And I don't think anyone has to
3 obviously spend time on the contract claims that are still out
4 there because of the stipulation so we don't need to deal with
5 that.

6 But certainly, like I said, if you're willing, that's an
7 approach I would be willing to do. You could -- if you all
8 want to agree on a one-page outline of the various elements,
9 we could look at that. You could look at it, and that way we
10 are all on the same page for purposes of preparation.

11 **MS. FORREST:** I think that would make sense so that
12 we are at least doing the point/counterpoint meeting each
13 other. Whatever our perspectives are, they are, but we can at
14 least have an agenda, if you will, of items.

15 **THE COURT:** That would work for me.

16 **MR. DOREN:** And, Your Honor, in terms of timing, this
17 would be immediately after trial or would this be after
18 closing briefing?

19 **THE COURT:** If we do this -- and, frankly, I
20 didn't -- wasn't clear to me that you would agree to this
21 approach -- then I'm happy to do it after close of evidence
22 because then that will help me go back and structure my
23 thinking in terms of reviewing the considerable amount of
24 evidence that's out there and it's what I would have -- it's
25 where I would have started. So having your perspectives in

1 that way would be great.

2 **MR. DOREN:** And, Your Honor, thank you for this. And
3 obviously we'll need to confer with our client, but we
4 appreciate you laying out a framework that would be helpful to
5 the Court.

6 **THE COURT:** So you don't agree yet?

7 **MR. DOREN:** I don't have client authority yet,
8 Your Honor. As I said, I came to the podium here with the
9 understanding of the Court's normal procedure, which we
10 supported. This proposal is -- sounds very constructive, but
11 I just need a chance to confer with my client.

12 **THE COURT:** Okay. He's here and they're here.

13 **MR. DOREN:** Yeah. It won't take long.

14 **MS. FORREST:** And, Your Honor, what we would propose
15 is that we would meet and confer over the weekend so that by
16 Monday morning, we can present an agenda to the Court. That
17 way if the Court has additional items that are not on the
18 agenda that the Court would find helpful, we will know that
19 early in the week.

20 I think that there is a likelihood that the evidence --
21 indeed a strong likelihood that the evidence will close next
22 week, and so this would be potentially something that would be
23 a next-week event.

24 **MR. DOREN:** And, Your Honor, two comments. First of
25 all, I now have authority to agree. So we have -- we do.

1 And, secondly, as to timing, simply since we will be
2 putting our case on next week, we would ask that rather than
3 follow the close of evidence on Friday, that it proceed Monday
4 morning.

5 **THE COURT:** I think I have this courtroom through
6 Monday the 24th. I thought that it might bleed over so I
7 tried to make sure that that worked with court operations.
8 And that would give you the weekend to assess. So Monday the
9 24th is fine.

10 **MR. DOREN:** Thank you, Your Honor.

11 **MS. FORREST:** That obviously works for us as well,
12 Your Honor. Thank you very much.

13 **THE COURT:** Okay.

14 **MS. FORREST:** One other short thing. We've
15 conferred. Today we would expect, depending upon how long the
16 witnesses go, that our primary witnesses will be completed.
17 We do have some -- we've listed some of the Apple witnesses in
18 our case in order to be able to utilize some documents and
19 testimony as part of our case so our actual sort of closing of
20 our case would be subject to that.

21 We will be ready to submit our final. It's only a
22 one-hour binder of deposition designations, but Mr. Doren and
23 I have conferred that everybody had, you know, sort of a huge
24 amount. My arms are stretched sort of as broad as my wingspan
25 is. We now have a very small amount. The

1 counter-designations should be also -- have an opportunity to
2 be -- have a scalpel to them.

3 So we would be prepared -- rather than submitting it today
4 at what would be the natural sort of close of our last
5 witness, we would be prepared to submit it Monday morning
6 after Apple has had an opportunity to take their scalpel to
7 their counters, if that is acceptable to the Court.

8 **MR. DOREN:** We have agreed on that, Your Honor.

9 **THE COURT:** All right. That's fine.

10 **MR. DOREN:** And similarly, Your Honor, as discussed
11 previously with the Court, Monday morning would be when, with
12 some luck, we move in the expert written directs with issues
13 resolved.

14 **THE COURT:** Okay.

15 **MS. FORREST:** And the last item. Sorry, Your Honor.

16 **THE COURT:** No apologies. Go ahead.

17 **MS. FORREST:** On Spotify, we learned this morning as
18 we came into Court that there is a motion for reconsideration
19 that has been filed, so we will respond to that in due course.
20 However, Mr. Even is here and is prepared to hand up a
21 document that was asked for yesterday. We could hand that up
22 now, Your Honor.

23 **THE COURT:** Okay. I thought I found it right
24 afterwards. I thought we had sent an email to you. If not,
25 go ahead, Mr. Even. I think I know which one it is. There

1 was a motion on it.

2 **MS. FORREST:** And I should say it's a motion to
3 strike, I think is the way the Spotify motion is cast. We
4 will respond to it in due course, Your Honor.

5 **THE COURT:** Okay.

6 **MS. FORREST:** That's -- I think that's all I had.

7 **THE COURT:** Okay.

8 Mr. Doren?

9 **MR. DOREN:** Nothing further here, Your Honor.

10 **THE COURT:** Okay. Then I believe it's the next
11 witness.

12 **MR. BORNSTEIN:** Your Honor, Gary Bornstein. Epic
13 calls Dr. David Evans.

14 **THE COURT:** Dr. Evans, I can't recall if I excused
15 you or not so I'm going to have Ms. Stone re-swear you in.

16 **THE WITNESS:** Certainly.

17 **DAVID EVANS,**

18 called as a witness for the Plaintiff, having been duly sworn,
19 testified as follows:

20 **THE CLERK:** Please be seated. And then be sure that
21 mic is underneath the shield there, and then please state your
22 full name and spell your last name.

23 **THE WITNESS:** My name is David S. Evans, E-V-A-N-S.

24 **THE COURT:** Okay. Welcome back. Good morning.

25 **THE WITNESS:** Thank you, Your Honor. Good morning.

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1 **THE COURT:** You may proceed.

2 **MR. BORNSTEIN:** Thank you, Your Honor.

3 **REBUTTAL EXAMINATION**

4 **DIRECT EXAMINATION**

5 **BY MR. BORNSTEIN:**

6 **Q.** Dr. Evans, welcome back.

7 **A.** Thank you, Mr. Bornstein.

8 **Q.** Did you prepare written rebuttal testimony for the Court
9 in this matter?

10 **A.** Yes, I did.

11 **Q.** Who wrote that testimony?

12 **A.** I did.

13 **Q.** Does the testimony accurately reflect some of the opinions
14 that you have regarding the opinions of Apple's economists?

15 **A.** Yes, it does.

16 **MR. BORNSTEIN:** Your Honor, we will deal with moving
17 it in pursuant to the procedures we've discussed.

18 **Q.** Dr. Evans, do you recall on Tuesday Mr. Swanson asked you
19 some questions about whether you had spoken to any antitrust
20 authorities on matters relating to Apple?

21 **A.** I do.

22 **Q.** Do you remember that topic came up at your deposition as
23 well?

24 **A.** I do.

25 **Q.** Have you had the chance to review your deposition since

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1 Tuesday?

2 **A.** Yes, I have.

3 **Q.** And has it refreshed your recollection about your
4 testimony?

5 **A.** It has.

6 **Q.** What did you actually testify at deposition about whether
7 you had worked on other competition matters relating to Apple?

8 **A.** I told Mr. Swanson that there was one other matter I had
9 worked on, antitrust matter with respect to Apple that
10 occurred in 2015 and 2016, and that it was under a
11 confidentiality agreement.

12 **Q.** And what did you actually testify about whether you had
13 met with antitrust authorities regarding that matter?

14 **A.** I indicated that I could not answer that question because
15 it was confidential.

16 **Q.** Thank you.

17 Did you listen to or read the Apple economist testimony
18 that has come in over the course of this past week since you
19 testified?

20 **A.** Yes, I have. I listened to Professor Schmalensee,
21 Professor Lafontaine, most of Professor Hitt, and then I read
22 the remainder of Professor Hitt's testimony.

23 **Q.** Did you either hear or listen to and do you remember
24 Dr. Hitt's testimony regarding what he characterized as growth
25 in output in app developer revenue and App Store transactions?

EVANS - DIRECT / BORNSTEIN

1 **A.** Yes, I do remember that.

2 **Q.** Do you agree with Dr. Hitt that there has been such
3 growth?

4 **A.** Absolutely. There has been tremendous growth in the
5 smartphone business over the last ten -- ten, twelve years,
6 and there has been incredible growth for Apple over the last
7 ten, twelve years.

8 **Q.** Does the fact of that growth cause you to doubt or change
9 your opinions regarding the anticompetitive effect of Apple's
10 conduct here?

11 **A.** Not at all. It's, of course, useful background to know
12 what's been happening in the business, but in terms of it
13 being relevant for assessing a conduct here, it is not
14 relevant for that because it doesn't allow one to compare the
15 but-for world without the conduct to the actual world with the
16 conduct, and therefore it doesn't -- doesn't permit an
17 antitrust economist to make any kind of causal inference as to
18 whether the conduct has interfered with competition.

19 **Q.** And aside from the general principle that you just
20 described, is there anything particular to a technology
21 industry like this one that makes that principle important?

22 **A.** Yes. We've known for at least the last 40 years that
23 these high-technology industries grow extraordinarily rapidly,
24 and we also know that oftentimes a dominant firm emerges very
25 quickly. So it's commonplace for there just to be tremendous

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1 growth in the -- in the business.

2 Q. What would be the consequence of accepting the notion that
3 you can just look at growth by itself in order to assess
4 anticompetitive effects?

5 A. Well, if that were truly credited, that would be
6 essentially a free pass for high-tech companies because they
7 all -- almost all have the same kind of pattern of
8 extraordinary growth.

9 Q. Do you recall Dr. Hitt's criticism of your testimony that
10 Apple had attained market power in the smartphone OS market
11 around 2010?

12 A. I do.

13 Q. And do you recall that one of the criticisms he leveled
14 was that there was not an obvious change in the trajectory of
15 growth in or around 2010?

16 A. I do remember that.

17 Q. What's your reaction to that testimony?

18 A. Well, that's not really a very sensible way of thinking
19 about market power in this context. I mean, first of all,
20 market power is a matter of degree. It's not like a switch
21 goes off one day and you have it or you don't and you change
22 your business behavior in general. There may be exceptions to
23 that, but that's not generally how it works. So that's point
24 number one.

25 But the point -- the other point, which is very important

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1 for this kind of a business, is in a -- in a rapidly-growing
2 industry where everything is expanding, it's not really
3 possible to look at those kinds of time series of growth and
4 refer any connection to that growth and changes in -- changes
5 in market power. It's just not -- it's just not an exercise
6 that statistically one could really do.

7 **Q.** Did you see the slides that Dr. Hitt used to illustrate
8 his testimony?

9 **A.** I did.

10 **Q.** All right.

11 Let's take a look at one of those slides, please,
12 Mr. Rudd, slide 25.

13 So we have on the screen, for the record, a record from
14 Dr. Hitt's demonstrative which is titled "*iOS Fortnite User*
15 *Accounts.*" Do you see that, sir?

16 **A.** I do.

17 **Q.** And this was one of a number of slides that Dr. Hitt used
18 to illustrate testimony he gave regarding his analysis of the
19 *Fortnite* user data; is that correct?

20 **A.** That's correct.

21 **Q.** First of all, what population of users do you understand
22 Professor Hitt's slide here to be addressing?

23 **MR. SWANSON:** Your Honor, we object to this. This is
24 undisclosed in the reports, the written direct.

25 **MR. BORNSTEIN:** Your Honor, this is a direct response

EVANS - DIRECT / BORNSTEIN

1 to Professor Hitt hit's testimony, and there is discussion
2 in -- there was extensive discussion of this at the -- at the
3 testimony on -- I guess it was yesterday or the day before.

4 **THE COURT:** This is rebuttal. If you want to bring
5 Professor Hitt back, you can.

6 **MR. BORNSTEIN:** I will just ask the question again in
7 case you don't have it in mind.

8 **Q.** Can you tell us, Dr. Evans, what population of *Fortnite*
9 users you understand this slide to cover?

10 **A.** Yes. There are two aspects to that. The title says "iOS
11 *Fortnite* User Accounts," and just to be clear on what that
12 means, it's -- it's anyone who has touched iOS, so that can
13 range from someone who logged in to iOS, who used the iOS
14 *Fortnite* app for five minutes all the way up to someone who
15 uses the iOS *Fortnite* app all the -- all the time. So it's
16 that full range of interactions with -- with the iOS *Fortnite*
17 app. So that's one dimension.

18 And then the second dimension is time period. This slide
19 covers March 2018 to July 2020, so it's about a 29-month
20 period.

21 **Q.** Okay. On the right half of the slide, Dr. Hitt indicates
22 that 35.9 percent --

23 **THE COURT:** But that period is the entirety of the
24 period of *Fortnite* users on iOS; correct?

25 **THE WITNESS:** That is correct.

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1 **MR. SWANSON:** Your Honor, I would object. This slide
2 wasn't used yesterday with Dr. Hitt.

3 **MR. BORNSTEIN:** This was part of Dr. Hitt's rebuttal
4 report, Your Honor, to which Dr. Evans is responding.

5 **THE COURT:** Are the numbers accurate and is it part
6 of his testimony?

7 **MR. SWANSON:** The slide was not used. There is a
8 reason for that.

9 **THE COURT:** Is the information in his report --

10 **MR. SWANSON:** Yes. Yes. I'm just trying to get the
11 record straight on whether it was used or not.

12 **THE COURT:** I appreciate that because now I won't go
13 back and look for slide 25.

14 Proceed.

15 **MR. BORNSTEIN:** Thank you, Your Honor.

16 **Q.** Dr. Evans, the right half of the slide refers to 35.9
17 percent of the population you described as being multiplatform
18 users. Do you see that?

19 **A.** I do.

20 **Q.** And what do you take from that particular statistic?

21 **A.** Well, I would -- I would also report the -- the complement
22 to that. So that says that 64.1 percent of the iOS *Fortnite*
23 user accounts were -- were single-homing on the iOS *Fortnite*
24 app. So, in other words, over that 29-month period, 64.1
25 percent only used -- only used the iOS *Fortnite* app.

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1 Q. And what's the relevance of that statistic to your
2 assessment of Apple's conduct here?

3 A. Well, it's -- it's an ingredient in -- in that assessment.
4 But what it says is that there is a large group of individuals
5 who are only using -- think of it as only using their iPhones
6 to play *Fortnite*. It could also be an iPad, but think of it
7 as only using their iPhone to play *Fortnite*. That tells me,
8 first of all, that there is a large group of individuals who
9 really just like using the smartphone to play *Fortnite*.

10 The other thing it tells me is that they -- I can't say
11 this with a hundred-percent certainty, but if they're playing
12 *Fortnite* and they're only using their -- their iOS device to
13 do that, they probably don't have a game console because
14 otherwise, you would play *Fortnite* on a game console.

15 Q. Let's turn to slide 28 of Dr. Hitt's presentation.

16 THE COURT: Was this used?

17 MR. BORNSTEIN: The concepts here, Your Honor, were
18 discussed at page 2142, beginning at that page of the
19 transcript.

20 THE COURT: Okay.

21 BY MR. BORNSTEIN:

22 Q. Dr. Evans, do you see at the bottom of the slide there is
23 a statistic that says 81 to 88 percent of *Fortnite*'s spending
24 by iOS users was retained?

25 A. Yes, I do.

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1 Q. What do you understand from Dr. Hitt's written and oral
2 testimony in this matter this retention rate is intended to
3 reflect?

4 A. Well, the calculation is the -- the amount of spending
5 that -- that -- that Epic had with the *Fortnite* app for this
6 group of users after *Fortnite* was removed from the -- from the
7 App Store divided by an estimate that Professor Hitt has
8 prepared of how much spending would have occurred in the
9 absence of that -- in the absence of that removal. So it's in
10 effect how much total revenue of that -- of that expected
11 amount Epic ended up -- ended up keeping.

12 Q. And do you understand Dr. Hitt to be talking about revenue
13 from all *Fortnite* users or some subset of *Fortnite* users?

14 A. It's the subset of *Fortnite* users who fit into that
15 category that I just described. It's individuals who at some
16 point in time had in effect touched the iOS *Fortnite* app --

17 Q. Okay.

18 A. -- in some way.

19 Q. And do you consider this retention rate, as Dr. Hitt
20 called it, a -- an informative measure of substitution by
21 these players?

22 A. It is not a measure of substitution.

23 Q. Can you give us an example to explain why that is?

24 A. Yeah. Let me give an extreme example. So let's take an
25 individual who spends a hundred dollars a month. They spend

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1 \$80 a month using their PS4 game console and they spend \$20 a
2 month -- this is before the removal of *Fortnite* -- they spend
3 \$20 a month using their iPhone to play -- to play *Fortnite*, so
4 that's what -- that's what the world looks like before the
5 removal of *Fortnite* from the -- from the App Store.

6 **Q.** And then how does that change afterwards in your example?

7 **A.** So in this extreme example, assume that -- that this
8 individual continues to use their game console, continues to
9 spend \$80 a month using their game console, but without having
10 access to the *Fortnite* app, let's assume that they don't spend
11 any money at all using the iOS *Fortnite* app, so their spending
12 drops from \$20 to \$0.

13 **Q.** So in that circumstance, what would Dr. Hitt calculate as
14 the retention rate?

15 **A.** He would calculate -- in this example, he would calculate
16 a retention rate of 80 percent: \$80 that Epic retained
17 playing on the game console divided by the hundred dollars
18 that -- that Epic would have expected to have retained if it
19 had gotten both the \$20 and the \$80 from that user, so 80
20 percent retention rate.

21 **Q.** So even though this individual completely stopped playing
22 on iOS and doesn't move any of her spending to another device,
23 Dr. Hitt still comes to an 80-percent retention right; is that
24 a good summary?

25 **A.** Yeah. Reflecting -- reflecting the fact that the

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1 individual is continuing to play on their game console after,
2 just like they did before.

3 **Q.** But all of the iOS revenue is lost?

4 **A.** In this example, yes.

5 **Q.** So why is that approach uninformative, in your view?

6 **THE COURT:** So are you saying that if someone is
7 playing as -- has access to both devices and they're playing
8 on the other device where they know they can spend *Fortnite* --
9 buy V-Bucks, they know they can spend it if they want to spend
10 it, that they choose not to spend it just because they can't
11 buy it off the phone?

12 **THE WITNESS:** No. I don't think -- I don't think --
13 in this particular example, I don't think that's -- that's --
14 that's addressed.

15 So there --

16 **THE COURT:** I was talking about your example.

17 **THE WITNESS:** The 80/20 example?

18 **THE COURT:** Yes.

19 **MR. BORNSTEIN:** Your Honor, could I ask a question
20 that might clarify things?

21 **THE COURT:** Yes, please.

22 **BY MR. BORNSTEIN:**

23 **Q.** In your example, Dr. Evans, what is the triggering event
24 for this individual no longer spending anything on her iPhone?

25 **A.** The triggering event is the removal of the *Fortnite* app

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1 from the -- from the App Store. So this is the -- this is the
2 before-and-after scenario that Professor Hitt and I are both
3 addressing.

4 **THE COURT:** Proceed, Mr. Bornstein.

5 **MR. BORNSTEIN:** Thank you, Your Honor.

6 **Q.** In your view, Dr. Evans, what would be the right way to
7 measure the amount of substitution that an iOS player
8 engages -- engaged in when the *Fortnite* app no longer became
9 available for her to play --

10 **A.** The -- the --

11 **Q.** -- on iOS?

12 **A.** The right measure of substitution is what happens to that
13 \$20, and I think perhaps this might help responding to the
14 Court's question.

15 It's possible that that \$20 moves entirely to the game
16 console, that the user decides after -- after *Fortnite* is --
17 is removed, to simply switch all that spending over to the --
18 over to the game console. So that's one possibility.

19 Another possibility is a smaller amount. So it might be
20 that instead of spending \$20, that that individual spends --
21 spends \$5. That's -- that shifts \$5 of spending from the
22 iPhone over to the game console so now spends \$85 on the game
23 console, and in that case, that \$5 is the measure of
24 substitution. That says that \$5 ended up getting substituted
25 away from spending on the iPhone over to the -- over to the

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1 about game console. So that's the number we want to -- we
2 want to focus on.

3 I gave the example of zero just as an illustration, but
4 what we are really interested in is out of that \$20, what, in
5 fact, does that user end up switching over to, in my example,
6 the PS4 but more generally to game consoles and PCs.

7 **THE COURT:** What if they spend \$20 on other games on
8 iOS?

9 **THE WITNESS:** That would be -- that would be a
10 different form of substitution for the user. In that case,
11 the user would be substituting away from Epic potentially over
12 to other games that they could play on their -- on their
13 iPhone. So that is a form of substitution that could very
14 well happen in the -- happen in the marketplace. But in that
15 case -- in that case, they're not substituting to game
16 consoles. They're substituting within the -- within the iOS
17 ecosystem.

18 **THE COURT:** Go ahead.

19 **MR. BORNSTEIN:** Thank you, Your Honor.

20 **Q.** And is the example that the Court gave of a player who
21 substitutes her \$20 in spending to other iOS games besides
22 *Fortnite* consistent with the market definition that you have
23 opined is appropriate here?

24 **A.** Yes. If that -- if that is what actually happened, that
25 behavior is consistent with a market definition that does not

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1 include game consoles and PCs.

2 **Q.** Let's move to a different subject.

3 Do you recall during Dr. Schmalensee's testimony there was
4 some discussion of your proposed foremarket definition for
5 smartphone operating systems?

6 **A.** Yes.

7 **Q.** And do you recall that Dr. Schmalensee criticized your
8 definition on the grounds that there is no actual explicit
9 price that is paid for either the iOS or Android operating
10 system?

11 **A.** I do.

12 **Q.** And do you recall he ultimately agreed that in fact there
13 is a price paid for Android. It's just not a cash outlay?

14 **A.** Yes. That's right.

15 **Q.** But aside from that, even assuming that Dr. Schmalensee
16 were correct that Android is free, would you agree that you
17 cannot properly define a smartphone operating system market
18 for that reason, because Android is free?

19 **A.** No. That's based on the proposition that you can't define
20 a market when there isn't a positive price for the goods sold,
21 and if that were true, there are an awful lot of markets
22 nowadays in the digital economy that you couldn't define
23 because we now have many, many products that are provided to
24 consumers at a price of -- at a price of zero. So it wouldn't
25 make any sense to be in the position where we basically

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1 couldn't apply economics or antitrust analysis to a
2 significant part of the -- of the digital economy. That would
3 not be a good outcome.

4 Q. Have you previously been involved in any antitrust matters
5 relating to operating systems?

6 A. I have.

7 Q. What case was that?

8 A. That was *U.S. vs. Microsoft*, the case that was brought by
9 the Justice Department in 1998.

10 Q. All right. And what was the market definition that was
11 ultimately accepted by the court in *Microsoft*?

12 A. The market definition was operating systems for
13 Intel-compatible computers. It included Windows, of course.
14 It included Linux, which is a free -- was then and is now a
15 free operating system. It included the BOSS, which no longer
16 exists.

17 Q. Did -- do you recall that Professor Schmalensee
18 distinguished the *Microsoft* case and the operating system
19 market there on the ground that Microsoft actually charged a
20 cash price for Windows?

21 A. I do.

22 Q. Do you agree as an economic matter -- set aside the law --
23 do you agree as an economic matter that that is a meaningful
24 distinction for defining a market?

25 A. I do not.

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1 Q. Can you explain why?

2 A. Well, just at a common-sense level, suppose -- suppose you
3 had that market and Microsoft was licensing Windows for a fee
4 and then decided to change its business model and do an
5 ad-supported model and drop the price to zero. From the
6 standpoint of users and from the standpoint of developers,
7 that market doesn't evaporate as a result of that decision to
8 drop the price to -- to zero. The market still exists. There
9 is a challenge, of course, in how antitrust economists go in
10 defining the market, but the market itself existed before that
11 event and after that event.

12 Q. Did you hear Professor Schmalensee's testimony that your
13 analysis in this case would also condemn the business models
14 of the game consoles?

15 A. I did.

16 Q. And do you agree with that testimony?

17 A. I don't at all.

18 Q. Can you explain why, in your view, Professor Schmalensee
19 was wrong on that point?

20 A. The analysis I've done in this case has been very specific
21 to the facts and circumstances of -- of Apple and its
22 practices and the iOS operating system, so it's been very
23 specific to the facts that we have here, the foremarket that
24 we have here, and the aftermarket that we have here.

25 In the case of game consoles, that's a very different

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1 business. That's a market where -- a situation where, in the
2 foremarket, there's competition to sell game consoles, and we
3 know from lots of -- lots of sources, that's intense
4 competition. The game consoles are sold, as we've discussed,
5 at a price of less than manufacturing cost or at a slight --
6 slight margin but generally at a breakeven or below-cost
7 basis. So the foremarket there is entirely different than the
8 foremarket that we have here.

9 The other significant difference is the relationship
10 between the foremarket and aftermarket.

11 **Q.** What do you mean by that?

12 **A.** Well, in game consoles, the main thing in the aftermarket
13 that consumers are buying are games, so it's sort of like the
14 printer and toner example that I gave, I think, the last time
15 I was on the stand here where someone is buying a printer and
16 then they know they are going to have to buy toner cartridges
17 later.

18 Well, likewise in the case of games -- of game consoles,
19 the primary thing they are buying in the aftermarket is just
20 one thing -- one type of thing, which are -- which are games.
21 So it's easier for them to predict life-cycle costs. There is
22 just -- I -- it's just a very, very different -- very, very
23 different business, and I have no reason -- of course I
24 haven't done the analysis so I admit that, but based on what I
25 know about that business, it is -- it is very hard for me to

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1 imagine that it would have the anticompetitive -- the
2 anticompetitive concerns that we have in this matter.

3 **Q.** Does the range of uses to which smartphones are put as
4 compared to game consoles have any relevance to that analysis?

5 **A.** Absolutely. So -- so game consoles, as we've talked
6 about, is a -- I don't want to say it's a niche product
7 because it's a big business now, but it's a -- it's an
8 industry, whereas when we talked about iOS and we talked about
9 the App Store, we're talking about foundational platforms that
10 support a large portion of the digital economy, the portion of
11 the digital economy that is based on -- based on apps. It's
12 really foundational.

13 The operating systems that we're talking about in this
14 matter, iOS and Android, those are now foundational
15 technologies, foundational platforms that support the -- the
16 app economy which is a big portion of the digital economy
17 where the digital economy is sucking up more and more of what
18 used to be the physical economy.

19 **Q.** To that end, Mr. Rudd, can we put up the demonstrative
20 that was used with -- with Professor Schmalensee.

21 **THE COURT:** Before you do that, given that he keeps
22 using this word "foundational platforms" or "foundational
23 technologies," are they utilities? Given what you've said,
24 are the smartphones utilities?

25 **THE WITNESS:** I would not use the -- the word

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1 "utility" as an economist.

2 **THE COURT:** In an antitrust context. I can read you
3 the same thing that I read to Professor Schmalensee because
4 what it sounds like you're saying to me is that these are so
5 fundamental --

6 **THE WITNESS:** Yeah.

7 **THE COURT:** -- that they're utilities.

8 **THE WITNESS:** Yeah. The -- it's a matter of -- it's
9 a matter of gradation. So the -- the electric company that I
10 depend upon to have electricity for me to function, economists
11 would attach the word "utility" to that just based on the
12 history of a utility regulation that we've had in this
13 country.

14 I'm not prepared to say that -- that not being able to
15 access a smartphone at this point in time rises to the same
16 level of not being able to use electricity or -- or water,
17 but -- but on the other hand, I mean, they are -- they are
18 very, very important, increasingly important technologies.

19 So I think --

20 **THE COURT:** Do you know what percentage of the
21 population in your analysis -- well, okay.

22 **THE WITNESS:** If I -- can I add just one other thing
23 to that?

24 You know, oftentimes when economists looking at the
25 history of regulation talk about utilities, we really are

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1 talking about a situation in which there is -- there is one
2 company, and it's an absolutely, positively essential service,
3 so that's --

4 **THE COURT:** Here you are saying there are two
5 companies and that it is, in effect, absolutely essential and
6 that is why it is so important that, despite the fact that
7 Apple and Android have created all of this technology, that
8 they give that technology or give access to their consumer
9 base to developers. I mean, I'm having a hard time
10 understanding the gradation that you're claiming given how
11 essential you claim it is.

12 **THE WITNESS:** Yeah. No, I understand that. The --
13 the only thing I'm resisting is -- is -- is stating that at
14 this point in time, I don't want to suggest that as
15 foundational platforms they are -- they are so -- they are
16 something where I would say to Congress that you should think
17 about regulating these companies like we would regulate
18 electric utilities in the past.

19 **THE COURT:** So you don't think -- you don't think
20 that the government should break them up or something like
21 that to add competition like they did, you know, with the
22 steel industry and all the other big industries?

23 **THE WITNESS:** So I'm a moderate on that topic,
24 Your Honor. There are economists and there is -- there is
25 significant debate going on now concerning -- concerning what

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1 to do with the technology companies, including -- including
2 Google and Apple and --

3 **THE COURT:** Right.

4 **THE WITNESS:** -- and so forth. I would not advocate
5 a regulatory solution. I would not advocate breaking them up.
6 I'm a strong believer that the antitrust laws, properly used,
7 can deal with the problems with these kinds of companies. And
8 I believe it would be a mistake to go down the road of -- of
9 regulation or extreme solutions.

10 I do believe that antitrust law is a -- is a flexible --
11 is a flexible method that I think can be very useful to
12 reining in and dealing with competition problems in the -- in
13 the digital economy. But there are -- I have colleagues who
14 would take a more extreme view on that subject.

15 **THE COURT:** All right. That's on me. Go ahead.

16 **MR. BORNSTEIN:** Thank you, Your Honor.

17 **Q.** Can we go to the very end of the slide, Mr. Rudd. Great.

18 And I think this follows up a little bit on the discussion
19 you were having with the Court.

20 Do you recall the testimony that Professor Schmalensee
21 gave in connection with this little demonstrative?

22 **A.** I do.

23 **Q.** Okay. And do you recall that I asked him about the second
24 lane here about physical in-app purchases and whether, in his
25 view, Apple could put up a toll booth on that particular lane

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1 as well?

2 **A.** I do recall that.

3 **Q.** And his testimony, do you recall, was "yes, just like
4 Amazon and Wal-Mart"? Do you remember that?

5 **A.** I do.

6 **Q.** Do you agree that Apple taking a commission on purchases
7 of physical in-app products, which they don't do now, would be
8 just like Amazon and Wal-Mart?

9 **A.** Well, of course not because in the case of -- in the case
10 of Apple, that lane is providing access to hundreds of
11 millions of iPhone users so that's a -- that's a much more --
12 it's a much more serious issue than -- than Amazon and
13 Wal-Mart.

14 **Q.** And is it just the numbers or is there something about the
15 alternatives that are available to consumers that is relevant
16 as well?

17 **A.** It -- yeah. It's -- it's both.

18 So the starting point for this exhibit is that at least
19 with respect to the -- to the install base of iPhone users,
20 these are the only roads in the town. I mean, these are the
21 only paths for a developer business to get to those consumers
22 with -- with an app. So that's -- that's one aspect of it.

23 And then of course the other aspect of it is the notion of
24 having a -- having a toll on that path.

25 **Q.** Well, would the -- would Professor Schmalensee's logic

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1 apply only to the toll itself, or if accepted, would it apply
2 to other restrictions that Apple imposes?

3 **A.** As I understood Professor Schmalensee's testimony with
4 respect to the anti-steering provisions and just going back to
5 the digital in-app purchases, it's that Apple has a right to
6 collect those commissions and therefore it has a right to
7 impose restrictions that would prevent the -- the developer
8 from bypassing those commissions.

9 I -- I believe he would apply the same logic to the -- to
10 the other situations.

11 **Q.** We can take the slide down.

12 Let me move to -- to one last topic that we can do in
13 public session.

14 And, Your Honor, I will have a small bit that I would ask
15 that we do under seal, consistent with orders that Your Honor
16 has given.

17 **THE COURT:** I think I heard a phone. Make sure to
18 have it off, please.

19 Go ahead.

20 **MR. BORNSTEIN:** Thank you, Your Honor.

21 **Q.** Can we have up on the screen, please, Mr. Rudd, paragraph
22 4 of Dr. Evans' written rebuttal testimony to the Court.

23 **THE COURT:** Dr. Evans' report?

24 **MR. BORNSTEIN:** Yes, Your Honor. His testimony. And
25 the rebuttal testimony specifically. And if it's helpful, we

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1 can hand up a copy, of course.

2 **THE COURT:** No. I have it.

3 **MR. BORNSTEIN:** Very good.

4 **THE COURT:** What I don't have is his deposition
5 testimony, if that's going to be necessary.

6 **MR. BORNSTEIN:** No, at least not for this
7 questioning.

8 **THE COURT:** Okay.

9 **BY MR. BORNSTEIN:**

10 **Q.** Dr. Evans, in paragraph 4 of your rebuttal written
11 testimony, you express certain criticisms of the Apple
12 experts' views on market definition; is that correct?

13 **A.** That's correct.

14 **Q.** And the second sentence of your testimony states,
15 "Professor Lafontaine says that market definition should focus
16 on the substitutes available to the plaintiff customer and
17 similarly-situated customers."

18 Do you see that?

19 **A.** I do.

20 **Q.** Do you agree with Professor Lafontaine's view on that
21 subject?

22 **A.** I do not.

23 **Q.** Can you explain why you disagree with her on that?

24 **A.** Yes. As I think I've stated previously, the starting
25 point for market definition is the -- is the supplier, the

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1 defendant in the case, and of course its product, and then the
2 issue that an antitrust economist looks at in terms of doing
3 market definition is what -- what substitute alternative
4 suppliers are out there to which customers could turn. And
5 ultimately what we're trying to figure out is whether in the
6 face of -- of a price increase enough customers overall would
7 turn to those other suppliers in order to -- in order to
8 constrain market power. That's more or less the question that
9 we're always trying to kind of get at when we analyze conduct
10 in an antitrust case.

11 **Q.** And what would be the problem that would occur if instead
12 of looking at all customers, you followed
13 Professor Lafontaine's suggestion and looked only at
14 substitutes available to the plaintiff customer and those that
15 were similarly situated?

16 **A.** Well, it depends on the plaintiff.

17 So if it's a -- if it's a -- if it's a plaintiff that
18 doesn't have -- that doesn't have any substitutes, then -- or
19 has few substitutes, then that would tend to lead to a very --
20 very narrow market definition because for that -- for that
21 plaintiff, there just aren't very many things that that
22 plaintiff can -- is thinking about turning to.

23 **Q.** And if you had a plaintiff with a very wide range of
24 substitutes compared to some of the -- the other customers in
25 that market, what would happen?

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1 **A.** Then that would lead to a very broad market definition
2 because then you're focusing on a customer that has lots of
3 opportunities, and in market definition, we're not -- we don't
4 want to focus on -- on either one of those individual
5 customers or similarly-situated ones. We want to look across
6 the board at customers because ultimately we're interested in
7 is there enough customer demand, are there enough customers
8 that would -- would shift their demand in response to a price
9 increase. So it's not specific to a customer. It's looking
10 overall across customers.

11 **Q.** And the reason that an economist would look to see if a
12 sufficient number of customers shift their demand is what
13 exactly?

14 **A.** It depends upon the context. If we're talking about
15 market power, it's a question of would enough customers switch
16 to discipline a firm from exercising market power. If we're
17 doing market definition, then we're looking at, in effect, the
18 market power of the hypothetical monopolist.

19 But it's always -- it always comes back to are there
20 enough customers that have good enough substitution options
21 that they would -- they would move and therefore discipline
22 the actor hypothetical monopolist or the firm with market
23 power that we're examining.

24 **MR. BORNSTEIN:** Your Honor, I have nothing else that
25 is appropriate for open session.

1 **THE COURT:** Cross.

2 **THE WITNESS:** May I just take a quick water break?

3 **THE COURT:** Absolutely.

4 **CROSS-EXAMINATION**

5 **BY MR. SWANSON:**

6 **Q.** Good morning, Dr. Evans.

7 **A.** Good morning, Mr. Swanson.

8 **Q.** You are not offering any opinion that the app-based
9 digital economy that you referred to is a relevant market in
10 this case?

11 **A.** I'm not.

12 **Q.** And if Apple's conduct does not harm competition in the
13 relevant market or markets in this case, then it doesn't
14 matter what Apple's role is in the digital economy, does it?

15 **A.** Not for the purpose of this case, no.

16 **Q.** You testified earlier that you are not expressing any
17 opinion on anything termed an essential facility or anything
18 related to an essential facility claim in this case. Do you
19 recall that?

20 **A.** That's correct.

21 **Q.** So when you use the term or a term like "gateway" or "toll
22 booth," that term is not synonymous with "essential facility";
23 correct?

24 **A.** So "essential facility" is a legal term, I believe, but I
25 would -- I would say that the way I'm using gatekeeper and

1 foundational platform, I'm not connecting that to the legal
2 concept of essential facility.

3 **Q.** All right. Thank you.

4 Now, in your written rebuttal testimony, you assert that
5 free or essentially so is the deal that Apple and other
6 successful OS providers typically make with developers. Do
7 you recall that?

8 **A.** I do.

9 **Q.** You don't contend, do you, that it is anticompetitive
10 unless Apple gives developers access to its intellectual
11 property for free?

12 **A.** Your question is am I saying that?

13 **Q.** That is my question.

14 **A.** I am not saying that.

15 **Q.** And you're not saying that Apple has to take or offer the
16 typical deal to avoid acting anticompetitively are you?

17 **A.** No.

18 **Q.** That would be the antithesis of innovation, wouldn't it?

19 **A.** I didn't follow the two questions connected together.

20 **Q.** If Apple were required to avoid anticompetitive conduct to
21 take or offer the typical deal, that would be the antithesis
22 of competition, wouldn't it?

23 **A.** I'm still confused by your question. You say
24 anticompetitive conduct. If Apple is engaging in -- in -- in
25 anticompetitive conduct, it's engaging in anticompetitive

1 conduct, and I assume there would be a remedy for that -- for
2 that conduct.

3 And I also assume if it's engaging in anticompetitive
4 conduct, that is likely to be harming innovation. But maybe
5 I'm not following your question, but that's what I took --

6 **Q.** I think you're not following my question.

7 If Apple is required to take or offer the typical deal to
8 avoid anticompetitive conduct, is that not the antithesis of
9 competition?

10 **A.** I don't understand what you mean when you say to avoid
11 anticompetitive conduct. You mean someone is engaging in
12 anticompetitive conduct with respect to Apple?

13 **Q.** I'll move on, Dr. Evans.

14 In your written rebuttal, you say that successful OS
15 providers typically offer developers a free deal; correct?

16 **A.** Yeah. I don't recall those precise words, but they
17 generally offer access to the operating system to developers
18 on a free or nominal cost basis.

19 **Q.** Right. Apple does not offer access to its intellectual
20 property for developers or to developers to allow them to
21 distribute through the App Store for free, does it?

22 **A.** You're asking me do Apple's current contracts allow all
23 developers to distribute apps through the App Store for free?

24 **Q.** Good --

25 **A.** They -- they do not. They impose obligations on

1 developers that have the -- have the result that some
2 developers have to pay commissions to the App Store as a
3 condition of securing distribution through the App Store.

4 **Q.** All right.

5 And who are the successful mobile OS providers in the
6 United States who have made the typical deal with developers
7 to offer access entirely for free to developers?

8 **A.** If we're talking about operating system providers --

9 **Q.** Mobile operating system providers.

10 **A.** If we are talking about mobile operating system providers,
11 putting the App Store aside and putting Google Play aside,
12 both iOS and Google have essentially that deal with developers
13 for the purpose of it developing apps.

14 **Q.** For the purpose of distributing apps. That's what we're
15 talking about, isn't it, Dr. Evans?

16 Which successful mobile operating system providers in the
17 United States have made the typical deal to offer developers
18 access to their operating systems for the purpose of
19 distributing apps for free?

20 **A.** So you're combining two things together.

21 The answer to your question is Apple requires certain
22 developers to pay for app distribution, and Google does as
23 well for Google -- for Google Play. Those are the -- Google
24 Android and iOS are the two -- Google Play and the App Store
25 are the two app stores globally outside of China and in the

1 United States.

2 **Q.** Did Windows Mobile offer the typical deal to developers to
3 let them distribute for free?

4 **A.** Windows Mobile, I believe, did have the same model as --
5 as -- as Apple in the sense that they provided access to the
6 Windows platform, to the Windows phone platform, for a nominal
7 fee, and it is the case that Windows phone did have a -- did
8 have an app store and did charge commissions for it.

9 **Q.** Can you give me an example of any OS provider that has
10 followed the typical deal to allow developers to offer apps
11 using its operating system commission free, entirely
12 commission free?

13 **A.** Well, Android was designed that way, so the Android
14 operating system and the framework for Android was -- was
15 designed that way. So Android is available for free. It was
16 developed by -- in part by Google. Android was -- was made
17 available and was made available in a framework in which,
18 absent restraints, it was possible with the Android operating
19 system to have sideloading, and it was possible for the
20 Android operating system to have -- to have multiple --
21 multiple app stores. So that's how the Android -- the Android
22 operating system, as a -- as an open source operating system,
23 was -- was created, and it's why in China it is possible
24 for -- for the Android ecosystem there to support both direct
25 distribution and to support numerous competing -- competing

1 app stores.

2 I mean, that's -- that is the operating system that was
3 originally funded by -- by Google and continues to get
4 Google's support. There are restrictions that are the subject
5 matter of the -- of the *Google* case concerning how that has
6 evolved outside of China, but the operating system itself, in
7 terms of how it was developed, was developed in a way that
8 permitted sideloading and allowed -- allowed other app stores.

9 **Q.** So the typical deal that you think Apple should have
10 followed is the deal that exists only in China?

11 **A.** No. I -- I don't think that accurately characterizes
12 my -- my testimony.

13 First of all, my -- my analysis starts with the point in
14 2008 where Mr. Jobs, as I testified before, made the
15 representation that the App Store is going to be operated on
16 a -- on a breakeven basis. And at that point in time, Apple
17 was basically saying that this is a standard -- standard deal
18 that is consistent with the other operating systems we've
19 talked about.

20 And if Mr.-- and if Apple had done that, then putting
21 the -- putting the monopoly App Store aside, it at least would
22 have been a situation in which it would have been the standard
23 arrangement where its users pay and -- and overall developers
24 are not bearing much of the cost. So that's -- that's a --
25 that's a -- that's an issue that is the starting point for my

1 analysis of anticompetitive effects.

2 If I could take just one more brief water break.

3 (Pause in proceedings.)

4 **THE WITNESS:** Thank you. Sorry.

5 **BY MR. SWANSON:**

6 **Q.** We'll come back to China.

7 Haven't you written that "The right to use property,
8 especially property that a business has developed to
9 investment in innovation, is essential for a free market
10 economy"?

11 **A.** I have. I agree with that.

12 **Q.** And you've also written "That property rights give their
13 owners the incentive to use their property in the most
14 efficient manner. They encourage people to create and improve
15 property through investment and innovation." You agree with
16 that still; right?

17 **A.** Absolutely.

18 **Q.** And don't you also argue in your writings that "The right
19 to use one's property ultimately serves consumers who, through
20 the market, benefit from improvements in products and
21 processes"?

22 **A.** Fundamental part of the market process. I absolutely
23 agree with that.

24 **Q.** Now, you agree that as a general matter of antitrust
25 economics, a firm has the right to exercise its own

1 independent discretion as to whom it will deal with. Do you
2 agree with that?

3 **A.** As a general matter.

4 **Q.** Do you agree that there are important economic reasons for
5 limiting the duty to deal by monopolists to extreme cases?

6 **A.** If you're quoting from something I've written, would it be
7 possible for me to see it?

8 **Q.** Well, if I quote from the deposition, I have to get the
9 judge's permission first. So if you tell me you disagree with
10 that, I can read to you your deposition.

11 **A.** If you could read the -- read the statement in the
12 deposition, that would be great.

13 **Q.** Can you tell me first do you agree that there are
14 important economic reasons for limiting the duty to deal by
15 monopolists to extreme cases?

16 **A.** I do.

17 **Q.** Okay.

18 Now, you're familiar with Judge Posner; correct?

19 **A.** I am.

20 **Q.** He is a keen scholar of antitrust economics; correct?

21 **A.** He is.

22 **Q.** Do you agree with him that if a firm went to a monopolist
23 and said, "Please, for the sake of competition, give me a loan
24 so I can compete with you and make this a competitive market,"
25 and it was turned down, that would not be anticompetitive

1 conduct?

2 **A.** I agree.

3 **Q.** Dr. Evans, in your written rebuttal direct, you stated
4 that "the average dollar-level commission paid by developers
5 for in-app purchases has increased dramatically." Do you
6 recall that?

7 **A.** I just want to make sure that I -- I -- I have the concept
8 of commissions straight from the quote that you read. If you
9 could just read that one more time for me, please.

10 **Q.** Why don't you turn -- do you have your report --
11 written -- not your report, but your written direct for your
12 rebuttal in front of you?

13 **A.** I'm afraid today I have nothing.

14 **Q.** Well, then --

15 **THE COURT:** You may give it to him, Mr. Bornstein.
16 Thank you.

17 **THE WITNESS:** Thank you. I have it now.

18 **MR. SWANSON:** Okay. Great.

19 **Q.** Turn to page 49 on page 16.

20 **THE COURT:** You are in rebuttal?

21 **MR. SWANSON:** I'm in the rebuttal written testimony,
22 paragraph 49, towards the bottom of page 16. It may carry
23 over to page 17.

24 **THE WITNESS:** Yes, Mr. Swanson. I have it now.
25

1 **BY MR. SWANSON:**

2 **Q.** So that last sentence that carries over, I think,
3 "Meanwhile, the average dollar commission paid by developers
4 has increased dramatically." I won't go through the numbers.
5 But you said that; correct?

6 **A.** I did.

7 **Q.** Now, you agree that each developer selects the price for
8 an in-app purchase in its own app?

9 **A.** I do.

10 **Q.** And --

11 **A.** Subject to -- subject to Apple's guidelines, but as a
12 general matter.

13 **Q.** Has to end in a 99, for example; right?

14 **A.** Yes, it does.

15 **Q.** In your various reports, you did not study the level of
16 the transaction prices for in-app purchases over time;
17 correct?

18 **A.** I did not.

19 **Q.** But you understand that Professor Hitt studied the level
20 of transaction prices for in-app purchases over time; right?

21 **A.** I do.

22 **Q.** And you understand from that analysis that the average
23 in-app purchase transaction price set by developers has been
24 rising since Apple opened the App Store; correct?

25 **A.** Yes. That's what it shows.

1 Q. And you understand that Professor Hitt's analysis shows
2 that developers have raised the price of there own in-app
3 offerings by 4- to 500-percent since the opening of the App
4 Store; right?

5 A. I believe there's an exhibit from Mr. Hitt that says that.

6 Q. And you have no reason to contest that, do you?

7 A. I don't.

8 Q. Now, in your own reports, you didn't study the reason why
9 there has been a 4- to 500-percent increase in the average
10 in-app purchase transaction price since the opening of the App
11 Store; right?

12 A. That's true.

13 Q. You said at your deposition that you don't have a firm
14 opinion on why developers have raised prices to that degree;
15 correct?

16 A. Well, I wouldn't characterize that as a -- I wouldn't
17 characterize that as a -- as a -- as a -- as a price increase.
18 I mean, they're selling -- they're selling --

19 Q. Professor, that's not the question I asked.

20 You said at your deposition that you don't have a firm
21 opinion on why developers have raised prices to that degree;
22 correct?

23 A. If you are quoting from my deposition and that's within --
24 within context, I don't have any reason to disagree with you.

25 Q. You agree, do you not, that --

1 **A.** I would have qualified that differently if I were going to
2 answer it again, but if that's what you say it says, then like
3 I said, I don't have any reason to disagree.

4 **Q.** Well, you haven't disclosed anything in your reports, and
5 you said in your deposition you don't have an opinion, so if
6 you want to say something more, it might be a little bit late,
7 Dr. Evans.

8 So let me move to this question: Do you agree that
9 Apple's commission is expressed as a percentage of the
10 developers' revenue; right?

11 **A.** It is.

12 **Q.** So if Apple's commission revenue increases, that's a
13 result of the developers' sales revenue increasing; correct?

14 **A.** It's a result of the developer sales revenues increasing
15 and Apple not decreasing its commission rate and therefore not
16 decreasing the charge -- the actual commission charged to
17 developers for the transaction.

18 **Q.** And if Apple's commission revenue increases because
19 developers raise in-app purchase prices, that is a result of
20 the mathematics of a commission arrangement, is it not?

21 **A.** It's a result of the mathematics of the commission
22 arrangement where the commission is stated as a percent and
23 where the commission rate doesn't -- doesn't decline and
24 therefore the absolute dollar charge per transaction
25 increases.

1 Q. Dr. Evans, in your written direct you say that "Apple
2 forbids developers from providing any information in their iOS
3 app that would let users know that they could make purchases
4 on another platform." Do you recall that?

5 A. I do.

6 Q. And its your belief that "Apple's anti-steering rules,"
7 which you put in quote marks, "prevent developers from
8 bypassing IAP by shifting the transactions to other platforms,
9 including websites." Do you recall that?

10 A. I do.

11 Q. You're familiar with the anti-steering restrictions at
12 issue in the *American Express* case; correct?

13 A. I am.

14 Q. Those are the ones that the Supreme Court held were not
15 anticompetitive; right?

16 A. That's correct. May I put this binder down?

17 Q. Yes, sure. Sorry. I didn't mean to impose that burden on
18 you.

19 Do you understand that the American Express anti-steering
20 provisions prohibit merchants from implying a preference for
21 non-Amex cards?

22 A. Yes. In the sense that when I -- I, an American Express,
23 cardholder, go to a -- go to a merchant, the American Express
24 anti-steering rules prohibit the merchant from -- from, having
25 accepted the card, doing things to persuade that cardholder

1 not to use the card, including refusing to take the card or
2 suggesting they use another card or, you know, otherwise
3 interfering with the -- with the consumer's preference to use
4 the American Express card.

5 **Q.** So, for example, those restrictions prohibit imposing any
6 special restrictions, conditions, disadvantages, or fees on
7 the American Express card; correct?

8 **A.** For an American Express cardholder who has walked into a
9 store that takes American Express cards, it -- it prohibits
10 the merchant from discouraging the consumer from -- from using
11 that card, yes.

12 **Q.** And you agree all of those restrictions are
13 pro-competitive, wouldn't you?

14 **A.** I do.

15 **Q.** And you would agree that the purpose of American Express'
16 anti-steering provisions is to prevent merchants from steering
17 business to American Express' competitors -- Visa, MasterCard
18 and Discover -- right?

19 **A.** No. I think it's much more narrow than that. It's narrow
20 in the sense that -- that it's -- it's targeted to a situation
21 where a consumer, who probably has multiple cards, walks into
22 a store that has an American Express logo on it, has a desire
23 to use her American Express card, and has a merchant who has
24 told American Express they want to accept the card and put the
25 logo on the door but then turns around and says to the

1 consumer -- I'm stating this a little bit imprecisely, but
2 "Consumer, I really would prefer that you not use that card."
3 It's that targeted setting that the -- that the American
4 Express anti -- anti-steering rules are targeted to. It's no
5 broader than that.

6 Q. Well, it's quite a bit broader than that, Dr. Evans.

7 You've read -- you're familiar with the case; right?

8 A. I'm familiar with the case. I'm familiar with the payment
9 card industry.

10 Q. Good. Then you know that the anti-steering provision
11 prohibits merchants from implying a preference for non-Amex
12 cards; correct?

13 A. So I -- I definitely agree with that statement. The --

14 Q. Good. Thank you, Dr. Evans.

15 A. No. If I could finish, Mr. Swanson, please.

16 Q. Well, I'd appreciate it if you would answer my question,
17 and I think you just did.

18 A. I don't think so.

19 Q. If you want to say something additional, you can wait
20 until your counsel asks you on redirect.

21 A. Okay.

22 Q. Now, my question for you is the purpose of the
23 anti-steering provisions, of which there are many for American
24 Express, is to -- the purpose is to prevent merchants from
25 steering business to American Express' competitors. Do you

1 not agree with that?

2 **A.** At the store where the consumer has walked in, seen the
3 sign that says -- in principle seen the sign that says "we
4 take American Express cards," it discourages -- the rules
5 discourage the merchant from then trying to prevent the
6 consumer from doing what they would otherwise do with that
7 American Express card.

8 **Q.** Well, the anti-steering provisions don't prevent merchants
9 from steering customers towards debit cards, checks, or cash,
10 do they?

11 **A.** So with respect to cash, you're right. With respect to
12 debit cards, I would have to get a refresher course on what
13 the anti-steering rules currently -- currently cover. But
14 you're definitely correct with respect to cash. So the
15 merchant can have a cash discount.

16 **Q.** You can check 138 Supreme Court at 2283.

17 The anti-steering rules at issue, did they not, made it
18 clear that they did not prevent merchants from steering
19 customers towards debits cards, checks, or cash? Do you doubt
20 that?

21 **A.** I don't recall.

22 **Q.** So you don't actually recall that the anti-steering rules
23 were devised to prevent merchants from steering business to
24 American Express' competitors?

25 **A.** So they -- my recollection is that they prevented

1 merchants from steering customers to other credit cards for
2 sure.

3 **Q.** And those are competitors?

4 **A.** If I could finish, sir. Not to cash for sure. And the
5 part of that that I did not recall is what the American
6 Express rules had been with regard to debit cards.

7 I actually don't know for a fact that the -- that the
8 rules have been consistent on that over time, but in any
9 event, I did not -- I did not recall with respect to debit
10 cards.

11 There is also an issue as to who American Express'
12 competitors are for the purpose of that case. It's credit
13 cards because that's the market that DOJ was able to
14 establish. Some of us in the payment industry might consider
15 that debit cards are also a competitor.

16 **Q.** Well --

17 **THE COURT:** Mr. Swanson, is Apple taking the position
18 that Apple is a competitor to the developers?

19 **MR. SWANSON:** No, Your Honor. Apple is taking the
20 position that it's a competitor to the platforms that
21 developers would steer business to.

22 So when Dr. Evans, for example, says in his rebuttal
23 report that anti-steering rules prevent developers from
24 bypassing IAP from shifting the transactions to other
25 platforms, including websites --

1 Q. Aren't you assuming that those other platforms and
2 websites are competitors?

3 A. The -- the two situations you're talking about,
4 Mr. Swanson, are just absolutely positively not -- not
5 analogous.

6 Q. I asked you a question about whether you are assuming
7 they're competitors. Are you?

8 A. I am assuming that for the purpose -- that for that set of
9 circumstances that -- that for conducting that transaction,
10 that given the prices, that those are alternative avenues and
11 therefore substitutes in that sense for -- for doing the
12 contraction -- doing the transaction.

13 Q. Dr. Evans, unless a developer has an independent ability
14 to compete through another platform, steering is of no
15 consequence, is it? Or anti-steering?

16 A. So it's not the developer competing, Mr. Swanson. I think
17 what you -- I think what you meant to say is that there are
18 other platforms that could -- could support a developer for
19 conducting transactions, and those platforms, such as having
20 Netflix, say, run on a PC, is a competitor for having Netflix
21 app on the -- on the iPhone. So I think we're talking about
22 not the developer as the substitute. I think we're talking
23 about the platforms as substitutes.

24 And, yes, I agree that in that -- in that context, the
25 ability to substitute between platforms, that they are

1 competing in -- in -- in -- in that sense. And that the
2 anti-steering restrictions are basically preventing that
3 escape valve for iOS app developers in the sense that it
4 limits their ability to -- to move -- to move that transaction
5 to that other platform.

6 **Q.** But you say it limits. But that ability must exist
7 independently. There must be independent competition for an
8 anti-steering provision to have a rationale; correct?

9 **A.** The rationale for the anti-steering is that it prevents
10 the developer from not doing the tie.

11 **Q.** Well, if you were correct that Apple --

12 **A.** Which is different --

13 **Q.** Dr. Evans --

14 **A.** Which is different than American Express.

15 **Q.** If you are correct that Apple has no competitors, has a
16 hundred percent of the market share, and if Dr. Cragg is
17 correct that technical and other differences between platforms
18 make competition impossible, then why is Apple concerned about
19 steering?

20 **A.** Because at a 30-percent commission, developers have an
21 incentive to direct consumers. In those cases where
22 developers are operating or have the ability to operate on
23 another platform at a 30-percent commission, the developer has
24 an incentive, in the absence of the anti-steering rules, to
25 try to encourage the consumer not to purchase on -- on -- on

1 IO -- on the App Store, not to use IAP, but to instead make
2 that purchase somewhere else. That's what the purpose of the
3 anti-steering restrictions are, to prevent the -- to prevent
4 the developer from informing the consumer that there is
5 another alternative available to them.

6 **Q.** Let's talk about that.

7 You said "Apple's rules prevent developers from providing
8 any information in their iOS app about purchases in another
9 platform." That's not what the review guidelines of relevance
10 say, is it?

11 **A.** If you could read the -- the state back to me again.

12 **Q.** "Apple's rules prevent developers from providing any
13 information in their iOS app about purchases on another
14 platform."

15 **A.** My understanding of the -- of the App Store's
16 anti-steering restrictions is that they prohibit developers
17 from basically providing any information, any call to action
18 that would provide that -- that -- that -- that app user with
19 information that they could -- could or should go off of --
20 off of the App Store and go somewhere else for that
21 transaction.

22 **Q.** You testified earlier this week that Epic is not able to
23 message iOS app users and tell them that they could go to the
24 web and get V-Bucks more cheaply. Do you recall that?

25 **A.** So I don't recall that -- that statement without any --

1 without any -- any qualifications. It's -- it's with regard
2 to what can be done in the -- in the app.

3 Q. Well, does Epic sell V-Bucks more cheaply on the web?

4 A. They do not.

5 Q. You're aware, are you not, that developers --

6 A. I'm sorry. More cheaply on the web relative to where?

7 I'm sorry. I answered that too quickly.

8 Q. Well, more cheaply on the web than they do on consoles.

9 A. The price -- the price on consoles and the price -- the
10 price on the web is the -- is the same. Obviously they don't
11 sell them at all on -- on -- on iOS app at the moment.

12 Q. Right. And that was a choice they made.

13 Now, do -- does Epic sell V-Bucks more cheaply on the web
14 than on any other platform? You raised it so I want to make
15 sure you have a chance to explain.

16 A. Not to my understanding.

17 Q. You are aware, are you not, that developers can and
18 routinely do communicate to users outside the iOS app about
19 different ways that users can make purchases?

20 A. I don't know that -- that -- I don't know the magnitude of
21 that activity. I don't believe -- I don't believe there is
22 significant activity. I wouldn't be surprised that something
23 like that happens sometimes, but in terms of significant
24 investments in talking about different -- different places
25 to -- to go to and different prices and so forth, I -- I'm not

1 aware of that.

2 **Q.** You never spoke with anyone at Epic before -- well, you
3 never spoke with anyone at Epic in a way that you relied upon
4 in formulating your opinions in any of your reports; correct?

5 **THE COURT:** On any topic or on the last one?

6 **MR. SWANSON:** Well, on any topic.

7 **Q.** Just in terms of what you indicated you relied upon in
8 your relied-upon lists in your two experts reports.

9 **A.** Yeah. As you know, Mr. Swanson, I have talked to people
10 at Epic, but in terms of my report, I did not rely on -- on
11 those conversations.

12 **Q.** Right. And since you didn't rely on them, I couldn't ask
13 you about them at your deposition so I wouldn't do that now.

14 But I take it you never took steps to familiarize yourself
15 with what Epic does to communicate with, for example, *Fortnite*
16 users about their options to purchase on different platforms?

17 **A.** I may have seen information on -- on that, but as a -- in
18 terms of something that I am -- that I collected data on and
19 so forth, no.

20 **Q.** Nothing in Apple's guidelines or contractual agreement
21 stops a developer from acquainting users outside of the app
22 with the developers' services and the purchase options it
23 offers; isn't that right?

24 **A.** That's true.

25 **Q.** Now, would you agree that -- or would you agree with

1 Judge Posner that a --

2 **THE COURT:** Mr. Swanson, let me just follow up on
3 that.

4 I thought that they could not collect information, that
5 Apple had access only to their information, so if they don't
6 have information, then they cannot communicate.

7 **MR. SWANSON:** Well, I'm going to get this evidence in
8 some other way or point you to where it is in the record, but
9 since -- going back to the time when *Fortnite* was on the app,
10 it's a multiplatform developer. It's under the multiplatform
11 rule. It has the right not to offer the multiplatform service
12 without having people sign in to *Fortnite*, so *Fortnite* has the
13 ability to know exactly who its users are so it can keep the
14 gameplay updated across -- across the apps.

15 **THE COURT:** All right. Proceed.

16 **MR. SWANSON:** Certainly if we haven't already, we
17 will be providing evidence on communications.

18 **THE COURT:** Thank you. Go ahead.

19 **BY MR. SWANSON:**

20 **Q.** Now, Dr. Evans, wouldn't you agree with Judge Posner that
21 a competitor has -- or a rival of a competitor has no right to
22 take a free ride on its competitors' sales force from an
23 economic standpoint?

24 **A.** I -- I do. Competitors shouldn't get a free ride.

25 **Q.** Okay. And --

1 **A.** I'm not sure anyone should get a free ride.

2 **Q.** Do you further agree with Judge Posner that you cannot
3 conscript your competitors salesmen to sell your product even
4 if the competitor has monopoly power and you are a struggling
5 new entrant?

6 **A.** I do.

7 **Q.** And do you agree with Judge Posner that advertising a
8 competitor's products free of charge is not a form of
9 cooperation commonly found in competitive markets. It is the
10 antithesis of competition. Do you agree with that?

11 **A.** I honestly don't understand the -- the -- the context of
12 that or the full -- or the full statement. There must be
13 something preceding the word "advertising" to say who is doing
14 the advertising.

15 **Q.** If -- if it's not a statement you agree with, you're
16 perfectly free to say that.

17 **A.** Well, I think I was just suggesting that it's an
18 incomplete statement, and as you read it, it just wasn't clear
19 what the beginning part was.

20 **Q.** So it's your opinion that advertising a competitor's
21 products free of charge is not the antithesis of competition?

22 **A.** I do agree with that.

23 **Q.** Okay. Are you aware that Spotify has anti-circumvention
24 rules to prevent its content creators from evading Spotify's
25 commission?

1 **A.** I don't know one way or the other.

2 **Q.** Has Spotify ever been a client of yours, if you're free to
3 disclose that?

4 **A.** I am not. I am not free to disclose that.

5 **Q.** The Amazon App Store also has anti-circumvention rules;
6 correct?

7 **A.** I -- I don't know that for a fact either. I haven't
8 looked at them.

9 **Q.** Do you know if the Samsung Galaxy Store has
10 anti-circumvention or anti-steering rules?

11 **A.** Same answer. I haven't looked at them.

12 **Q.** Are you aware if Airbnb has anti-steering or
13 anti-circumvention rules?

14 **A.** I think in that case I do.

15 **Q.** And they do, don't they?

16 **A.** They do.

17 **Q.** And eBay has anti-circumvention and anti-steering rules;
18 correct?

19 **A.** They do.

20 **Q.** You've written, haven't you, that "when practices are
21 common in pretty competitive markets, we have prior
22 information that these practices are efficient"?

23 **A.** I agree with that statement.

24 **Q.** Okay. Shifting topics a bit, since we have been dealing a
25 bit in metaphors, you would agree that a road, whether it has

1 a toll booth or not, requires traffic rules?

2 **A.** I do.

3 **Q.** So let's talk about the App Store guidelines.

4 You agree that the App Store Review Guidelines cover a
5 whole gambit of things that Apple thinks are in the interest
6 of promoting the Apple brand, do you not?

7 **A.** I do.

8 **Q.** App reliability is included among those things; correct?

9 **A.** Yes. That's correct.

10 **Q.** Okay. And whether an app would be offensive to consumers
11 is another interest served by the App Store Review Guidelines;
12 correct?

13 **A.** Yes.

14 **Q.** You've testified, at least in your deposition, that in the
15 but-for world, Apple can block competing iOS apps or app
16 stores when they do propose to do something bad. Do you
17 remember that?

18 **A.** Yes. Subject to the qualification, either in that
19 statement or around it, that in the but-for world, Apple can
20 definitely pursue its business interests subject to not
21 replicating or engaging in anticompetitive conduct.

22 **Q.** Well, if Apple, in the but-for world, can block competing
23 iOS app stores or apps when they propose to do something bad,
24 does that include when apps or app stores are doing something
25 that invades users' privacy?

1 **A.** So I'm not -- I'm not really prepared to go through a list
2 of what they can or can't do. They -- they can't, in my
3 but-for world, engage in a course of conduct that, in effect,
4 replicates preventing competition in -- in -- in app stores,
5 and beyond that, I'm not sure I have an opinion.

6 **Q.** Well, you indicated in your deposition that in the but-for
7 world, Apple could have an objective set of criteria for bad
8 behavior that would allow it to revoke an App Store's access
9 to iOS. Do you remember that?

10 **A.** I -- I do. That, I think, was in the context of the
11 hypothetical rogue app store.

12 **Q.** Well, a hypothetical but-for world.

13 **A.** Well, a hypothetical rogue app store that operates in
14 the -- in the hypothetical but-for world.

15 **Q.** Well, rogue app store is not the only example of bad
16 behavior that you believe that Apple could have an objective
17 set of criteria about; right?

18 **A.** That's -- that's correct.

19 **Q.** Now, at the same time, you indicated that Apple couldn't
20 intervene in the details of how other app stores work in the
21 but-for world; correct?

22 **A.** That's correct.

23 **Q.** Who would decide whether Apple's sort of objective
24 criteria were objective enough?

25 **A.** Well, it would be the -- if we're talking about this case,

1 it would be the ordinary situation that we have in a -- in an
2 antitrust -- antitrust remedy where there are ground rules
3 typically set, in my experience, with antitrust revenues
4 concerning preventing -- preventing the party from engaging in
5 anticompetitive behavior, and typically when remedies are
6 established, there are -- that's something that -- that's
7 thought about.

8 **Q.** So you're saying the court would decide?

9 **A.** Or -- or that no one -- no one decides and that it's not
10 an issue because the ground rules are clear, that you can't
11 engage in anticompetitive behavior but that you can pursue
12 reasonable business interests. Whether there are gray areas
13 there, I'm not really prepared to speculate on, but it's not
14 obvious to me that -- that -- that this is -- this is a tough
15 one.

16 **THE COURT:** Would a rogue app store include one that
17 offers pornography?

18 **THE WITNESS:** So I think that's -- I don't know if I
19 have a good answer to that one, Your Honor.

20 **THE COURT:** That's not stark enough for you?

21 **THE WITNESS:** The -- where I'm a little bit troubled
22 by that is what interests on the part of Apple is being
23 protected by that. So you have an iPhone --

24 **THE COURT:** I'm just trying to understand if there
25 are any boundaries to what you're classifying as a rogue app

1 store. I thought pornography might be a simple one, but it
2 sounds like it's not.

3 **THE WITNESS:** Yeah. I mean, the only reason I'm
4 resisting it a little bit is because obviously in the case
5 where we're talking about the security of the iPhone and
6 hacking and things like that, I think that's -- I think that's
7 very -- I think that's very clear.

8 In the case of an app store that had pornography, I
9 would -- I would like a world in which Apple is able to -- is
10 able to prevent that. It doesn't seem to me that there are
11 any anticompetitive considerations that would arise if
12 Apple -- if Apple chose to -- chose to do that. So I do think
13 that is something that Apple could -- could do.

14 The one, I guess -- I don't want to make it a
15 qualification, but it's not like the -- it's not like the --
16 the iPhone now is designed in a way where owners of iPhones
17 can't access pornography. I mean, obviously there's --
18 there's the Safari browser that people can use and there are
19 apps on the App Store that while they're -- they're not
20 specialized in pornography, you do have the situation, you
21 know, currently with the iPhone that people can -- people can
22 get access to the Facebook app and you have all the issues
23 surrounding Facebook that we all know about, including videos
24 on beheadings and all that kind of stuff. So it's not like
25 the iPhone currently is in a situation where users are

1 protected from all of this.

2 But getting back to where you started, yes, I agree that
3 Apple, as a matter of business policy, could decide that it
4 did not want pornographic app stores able to use iOS.

5 **THE COURT:** Mr. Swanson.

6 **BY MR. SWANSON:**

7 **Q.** Now, it's your opinion on that, Dr. Evans, that in the
8 but-for world, Apple could revoke the access over an app
9 store, but it couldn't stand as a decider of which stores get
10 to go on to iOS; correct?

11 **A.** I'm not sure what distinction you're making.

12 **Q.** Well, as I understood it -- and you can tell me if you
13 have a different view -- in the but-for world, Apple isn't
14 allowed to decide who competes with it with an app store on
15 iOS, but in your view, it could revoke the license that it is
16 compelled to give if it determines, for example, that a rogue
17 app store is operating. Do you have a different view?

18 Are you saying that Apple has to review every app store
19 before it gives it a license to operate on iOS in the but-for
20 world?

21 **A.** As I sit here today, I don't -- I don't -- I don't -- I
22 don't have a view on what scrutiny it could give before and --
23 and -- and after.

24 **Q.** Well, in your deposition, you indicated that you didn't
25 think it would be a problem if Apple was limited to remedying

1 rogue app stores by taking them down after the fact. Do you
2 recall that?

3 **A.** Yeah. I agree they could take them down after the fact.
4 I don't have any reason -- I don't know what I said in the
5 deposition, but I don't have any reason, as I sit here today,
6 to say that if Apple knew that -- that a -- that an app store
7 was a rogue app store, that it was a pornographic app store,
8 that it supported terrorism or something like that -- if Apple
9 knew that, then I don't care what point in time we're talking
10 about, I think Apple, as a business matter, could take actions
11 to -- to prevent that.

12 I think in the but-for world we're actually talking about,
13 I would expect that there are going to be responsible app
14 stores that want to be in the business of distributing apps,
15 but for the cases you're talking about, if Apple has
16 information before or after the fact or wants to have a review
17 process or whatever to prevent bad things from happening, as I
18 sit here today, I don't have any reason to draw a demarcation
19 on -- on what Apple should do depending upon when it comes in
20 possession of that -- of that -- that evidence that there is a
21 problem.

22 **Q.** In your opinion, would a rogue app store include one that
23 distributed apps that were not compliant with Apple's policies
24 with respect to user privacy?

25 **A.** As a -- as a -- as a general matter, no, so long as it's

1 not being done for anticompetitive purposes. Obviously there
2 are scenarios one can imagine where that denial could have
3 competitive implications, but if it's being done because --
4 because the app or app store is doing something that is
5 invading the user's privacy on the iPhone, then, sure, that --
6 that seems to me something that Apple can deal with.

7 **Q.** Well, in your but-for world, who resolves disagreements
8 about privacy policy when Apple seeks to implement consumer
9 privacy rights on the iPhone and those efforts conflict with a
10 third-party app store's policy decisions?

11 **A.** So there -- there are -- there are a couple of notions of
12 privacy that are going on here. When we were talking about
13 privacy, I thought you were talking about situations where the
14 app store or app or whatever was doing things that were
15 somehow tapping into or -- or invading the user's privacy with
16 respect to the -- with respect to the iPhone.

17 In a -- in a competitive market, I would expect that app
18 stores and apps make different decisions concerning the level
19 of -- the level of -- of privacy, by which I mean how much
20 data consumers need to provide in return for various services
21 that they're getting from the -- for the app. That's
22 generally in this -- in this economy what we're talking about
23 when we speak about privacy, that that's something that gets
24 determined in the -- in the competitive market. And that
25 different app stores and different apps can make different

1 decisions on that with willing -- willing users and developers
2 on either side.

3 **Q.** Well, doesn't that get determined in the competitive
4 market today when people decide whether they want to buy an
5 iPhone, which, as you said, reflects Apple's efforts to
6 advocate user privacy rights or an Android phone which takes a
7 different approach?

8 **A.** No. I think that's determined -- I think that's
9 determined today by a consumer buying an iPhone and then
10 having to use the -- having to use the -- the App Store. I
11 mean, the -- the troubling part of the direction you're going
12 in is that --

13 **Q.** Dr. Evans, I think the direction I'm going in is something
14 for someone else to determine.

15 Can you tell me if it is the case then that in your
16 but-for world, Apple will lose control over the amount of
17 respect for user privacy rights that are offered by apps on
18 the iPhone?

19 **A.** It will -- it will lose the right to dictate the -- the --
20 the privacy rules and other dimensions of competition
21 between -- between app stores. I mean, the whole -- the whole
22 issue here is, you know, we've talked about -- we've talked
23 about privacy, but one could raise all sorts of other issues
24 here, and once you roll all of them together, we're back to
25 Apple basically being able to dictate what -- what other app

1 stores can -- can compete and we're back into the situation --
2 this is the road I was talking about you are going down --
3 where Apple is also in the position where it can make these
4 kinds of determinations concerning app stores and apps in ways
5 that advantage Apple as a -- as a -- as a developer of its own
6 first-party -- first-party apps.

7 So it's possible that Apple could make decisions with
8 regard to privacy that are for pro-competitive reasons. It's
9 also possible that Apple could make decisions on privacy for
10 the purposes of advantaging its own ad-supported business
11 model. I mean, there are lots of variations of -- of this.

12 So the road I don't want to go down is one where Apple has
13 the right to basically go back to being a monopolist and
14 making all the determinations and what can actually happen in
15 this business.

16 **Q.** Let's focus on the road you want to go down.

17 Throughout this case, you've held out the Android
18 marketplace in China as a shining example where competition,
19 quote, "takes place on the merits," unquote; correct?

20 **A.** If you could refer me to where I say the word "shining."

21 **Q.** I said quote, "takes place on the merits." I said
22 "shining."

23 **A.** You gave me a quote that used the word "shining." Was
24 that a quote from me or something you said?

25 **Q.** The quote from you was the part of my question that had

1 quotation markets on it, "takes place on the merits."

2 Let's turn to paragraph 55 --

3 **A.** I'm not -- I'm not able to see the quotation marks so I
4 assumed when you read me that you were representing that that
5 was a statement from me, which is why I questioned you on it.

6 **Q.** Perfectly fine. And that's why I just told you to turn to
7 paragraph 55 of your own report, page 18. I'm sorry. Your --

8 **THE COURT:** Rebuttal.

9 **MR. SWANSON:** Sorry. Direct.

10 **THE COURT:** Written direct.

11 **MR. SWANSON:** Right. Not report.

12 **THE WITNESS:** So I have a copy of my rebuttal report.
13 I don't have a copy of --

14 **MR. SWANSON:** Your written direct? Then I believe we
15 can supply one.

16 **THE COURT:** Mr. Bornstein seems to be suggesting he
17 does.

18 **MR. BORNSTEIN:** I believe the one I handed Dr. Evans
19 is the rebuttal written testimony. Is that what you are
20 looking for, Mr. Swanson?

21 **MR. SWANSON:** Yes --

22 **THE COURT:** No. The direct. Is somebody getting him
23 his direct?

24 **MR. SWANSON:** Were you indicating he already has it?

25 **MR. BORNSTEIN:** He has the rebuttal.

1 **MR. SWANSON:** The rebuttal direct testimony. That's
2 what I'm --

3 **THE COURT:** Okay.

4 **MR. SWANSON:** Sorry for all the confusion. There are
5 lots of reports and lots of written testimony.

6 **Q.** So you should have it -- it should be paragraph 55, page
7 18.

8 **A.** I have it. I think I've lost track, Mr. Swanson, in what
9 you want me to look at.

10 **Q.** All right.

11 **THE COURT:** It's the second sentence, paragraph 15 --
12 or 55.

13 **MR. SWANSON:** Or even starting with the first
14 sentence.

15 **Q.** "Apple has a monopoly over the distribution of iOS apps,
16 one that resulted from anticompetitive foreclosure of
17 competing app stores. But for that foreclosure, developers
18 would have a choice of whether to use Apple's Payment
19 Solution, and competition would take place on the merits, as
20 that has occurred with Windows, Mac computers and for Android
21 in China."

22 **A.** I see it.

23 **Q.** So you view competition on Android in China as an example
24 of the road that you would like to see Apple travel; right?

25 **A.** Well, the road I would like to see Apple travel is not

1 replicating China. The road I'd like to see Apple travel is
2 Apple obviously is a very successful app store integrated and
3 included on the iPhone having competition. I don't see that
4 road as one that replicates -- replicates China because in my
5 but-for world, Apple has the App Store, it still is able to
6 bundle it with the iPhone, and there's the possibility of
7 competition.

8 I do, however, take China as an example of a -- of
9 another -- of another situation in which there has been
10 essentially unbridled competition in -- in app stores.

11 Q. And in your opening expert report, you stated that Apple
12 is a monopolist outside of China as well as inside China. Do
13 you recall that?

14 A. I do.

15 Q. So you think Apple is a monopolist in China; right?

16 A. So, again, I think you've read -- I think I would actually
17 like to see that statement because I believe with respect to
18 the topic, we're talking about the App Store and not Apple as
19 a company. If I -- if I didn't make that qualification in the
20 statement that you just read, then I would -- I would -- I
21 would limit it to the App Store because I believe that's the
22 context in which I was discussing that.

23 Q. So you believe Apple is -- Apple's App Store is a
24 monopolist in China; is that correct?

25 A. The -- the App Store is the monopolist distributor of iOS

1 apps in China just as it is outside of China.

2 Q. Apple's distribution in China is the same as it is in
3 terms of the rules we're talking about; correct? The same as
4 it is in the United States?

5 A. I believe so.

6 Q. And you say Apple is a monopolist in China, although
7 Android phones are extraordinarily dominant in China; correct?

8 A. So, again, I have to ask you, Mr. Swanson, you -- you --
9 you stated that as if I said in quotation marks Apple is, and
10 if I did, then that's fine, but I just want to make sure that
11 when you read things like that, that it's actually my words
12 because you're saying it in a way that suggests it's my words,
13 and if it is, that's fine --

14 THE COURT: I didn't interpret it that way. He
15 didn't use quotes.

16 THE WITNESS: Okay. Okay.

17 BY MR. SWANSON:

18 Q. And it is paragraph 501 of your report where you said
19 "Apple is a monopolist outside of China as well as inside of
20 China."

21 A. Okay.

22 Q. Now --

23 THE COURT: Can we get an answer to the question?
24 Are Android phones predominant in China?

25 THE WITNESS: Android phones are predominant in China

1 both on a unit basis and in terms of dollar sales. Apple's
2 share of the -- of the smartphone business in China is smaller
3 on a -- on a dollar-unit basis than it is outside of China.

4 **THE COURT:** And is it correct that it's
5 extraordinarily dominant, Android? Ballpark figures between
6 Android and iPhone in China.

7 **THE WITNESS:** Yeah. I think -- I think the iPhone in
8 China is about 20 percent of total smartphone revenue so in
9 the neighborhood of 20 to 25 percent.

10 **THE COURT:** And Android 80, percent?

11 **THE WITNESS:** That's correct. Is the remainder,
12 that's correct.

13 **BY MR. SWANSON:**

14 **Q.** Now --

15 **A.** It is still a lot of phones.

16 **Q.** Dr. Evans, at least at the time of your deposition, you
17 had no view on whether Apple's iPhones are far more secure
18 than Android devices in China?

19 **A.** I think that's correct.

20 **Q.** And isn't it a fact that the incidence of malware
21 distributed on Android devices through all of these
22 competitive app stores is significantly higher in China than
23 the incidence of malware distributed on iOS devices in China?

24 **A.** I think that is true.

25 **Q.** And isn't it true that the top three app stores on Android

1 are the ones where users were most likely to download malware
2 in 2020 in China?

3 **A.** I don't know that that's the case.

4 **Q.** Isn't it true that there's rampant disregard of developer
5 intellectual property rights by Chinese Android app stores?

6 **A.** Not that I'm aware of.

7 **Q.** You're not aware of Chinese Android app stores scraping
8 developers' apps from other platforms?

9 **A.** I'm not. These are -- these are -- these are large --
10 these are large, reputable businesses in -- in China, so I
11 don't know the facts that you're speaking of, but I'm
12 certainly not aware of that kind of rampant -- rampant
13 behavior.

14 **Q.** These 50 Android app stores that you're talking about are
15 all large, reputable businesses?

16 **A.** I believe your question referred to the top three app
17 stores in China.

18 **Q.** Oh, no. I've moved on. I'm sorry. So I can repeat it if
19 you'd like.

20 Isn't it true that there is rampant disregard of developer
21 intellectual property rights by Chinese Android app stores,
22 plural, not just the three top ones?

23 **A.** I don't know if there are small app stores that fall into
24 the category that you're -- you're talking about. I simply
25 don't know.

1 Q. Isn't it true that most Android app stores in China charge
2 a 50-percent commission on game apps?

3 A. It is true that that is the headline rate. Those rates
4 are -- are negotiated, and, as you know, in China, there is
5 direct distribution that is also available.

6 Q. You're aware that Tencent, the largest game developer in
7 China by a very large measure, pays no less than a 30-percent
8 commission to Android app stores in China?

9 A. That's correct for the portion of their volume that they
10 distribute through Android. Most of the volume or a large
11 portion of their volume is distributed directly or through
12 their own App Store.

13 Q. And Apple, the company you say is a monopolist in China,
14 charges just 30 percent?

15 A. That's correct.

16 Q. One last question, at least until I guess Mr. Bornstein
17 has us convene in sealed session, but you had indicated that
18 you thought your opinions here would have no implications for
19 the console industry; correct?

20 A. I think what I testified to is that the favorable outcome
21 in this case or, rather, the economic analysis that I had done
22 in this case with regard to anticompetitive behavior would not
23 apply to the console industry.

24 Q. Are you aware that since the trial in this case began,
25 that Sony Interactive was sued for similar alleged conduct

1 with respect to the PlayStation under the antitrust laws?

2 **A.** I'm not.

3 **MR. SWANSON:** Nothing further at this time,
4 Your Honor.

5 **THE COURT:** Redirect?

6 **MR. BORNSTEIN:** Thank you, Your Honor.

7 **REDIRECT EXAMINATION**

8 **BY MR. BORNSTEIN:**

9 Dr. Evans, do you still have your rebuttal report in front
10 of you? I'd like to -- excuse me. Your rebuttal written
11 testimony.

12 **A.** I do.

13 **Q.** I'd like to turn you back to the paragraph that
14 Mr. Swanson had directed you to, which was paragraph 55 on
15 page 18.

16 **A.** I have it.

17 **Q.** Okay. And he directed you to the second sentence there
18 which says that "But for the foreclosure, developers would
19 have a choice of whether to use Apple's Payment Solution and
20 competition would take place on the merits as has occurred
21 with Windows and Mac computers and for Android in China." Do
22 you see that?

23 **A.** I do.

24 **Q.** Do you know what Apple says about whether the Mac computer
25 is safe for users to use?

1 **A.** Yes. It represents that it's safe.

2 **Q.** Do you know what Apple says about whether the Mac computer
3 protects users' privacy?

4 **A.** It does.

5 **Q.** And that's even though there are multiple app stores in
6 direct distribution available on the Mac; is that right?

7 **A.** That's correct.

8 **Q.** All right. You can set that aside.

9 You were asked a number of questions about the Amex case,
10 which we can't seem to get away from. Do you recall that?

11 **A.** I do, and I agree we can't seem to get away from it.

12 **THE COURT:** I don't think any of us can get away from
13 it, Mr. Bornstein.

14 **MR. SWANSON:** So stipulated.

15 **BY MR. BORNSTEIN:**

16 **Q.** Some of us are proud of that case, my firm having been
17 involved.

18 Dr. Evans, you were also asked about -- in connection with
19 the Amex anti-steering provisions in other platforms. Do you
20 recall those questions?

21 **A.** I do.

22 **Q.** For example, you were asked about the Amazon App Store,
23 Samsung's Galaxy Store, Airbnb and eBay. Do you recall that?

24 **A.** I do.

25 **Q.** Do you have any knowledge or opinion about whether the

1 Amazon App Store has market power?

2 **A.** I do have an opinion on that.

3 **Q.** What is that?

4 **A.** It does not.

5 **Q.** Does the Galaxy, Samsung's Galaxy Store, have market power
6 in the distribution of apps?

7 **A.** No.

8 **Q.** Does Airbnb have market power in its business?

9 **A.** Not yet.

10 **Q.** Does eBay have market power in its business?

11 **A.** No.

12 **Q.** To be clear, have you carefully studied each one of these?
13 I've kind of put you on the spot, so I don't want to hold you
14 to all of this.

15 **A.** I have not.

16 **Q.** Okay. Here's one that is maybe more specific.

17 Do you know what the Supreme Court said about whether the
18 government had proven that Amex had market power?

19 **A.** The government had not proved that Amex had market power.

20 **Q.** There was a time in the -- in the testimony that you were
21 giving with Mr. Swanson when he asked you a question about the
22 Amex case, and he asked whether you understood that the
23 anti-steering rules forbid merchants from implying a
24 preference for non-Amex cards. Do you recall that?

25 **A.** I do.

1 Q. You really wanted to give an answer that Mr. Swanson
2 didn't let you to give. Do you recall what that answer was?

3 A. I don't.

4 Q. Okay. I'll ask you a fresh question then.

5 In the case of the Amex anti-steering rules, is there
6 anything that prohibits a merchant from prominently displaying
7 in its window that it accepts Visa and that it accepts
8 MasterCard?

9 A. No. And that's what merchants do.

10 Q. And is that also the case for the app store? May an app
11 prominently display that buyers can purchase on the web or on
12 another platform?

13 A. No. That's what they can't do.

14 Q. And Mr. Swanson asked you a number of questions about
15 whether the App Store -- excuse me -- the App Store Review
16 Guidelines prohibit various types of communications with
17 customers, and he even made a bit of an off-the-record
18 representation which he fairly qualified that some evidence
19 would need to be presented to support. Do you recall that?

20 A. I do.

21 Q. Do you understand that the actual language of the App
22 Store Guidelines prohibits apps from both -- we can -- I don't
23 know if we have this on the screen or not.

24 I'm looking at PX56, which is in evidence, Your Honor.

25 Section 3.13, do you recall, says that "Apps cannot,

1 either within the app or through communications sent to points
2 of contact obtained from account registration within the app,
3 encourage users to use a purchasing method other than in-app
4 purchase"?

5 **A.** I do recall that.

6 **Q.** Staying on the anti-steering rules for just a second, do
7 you recall Mr. Swanson's questions implying that the presence
8 of anti-steering rules mean that the App Store must face
9 competition because there's no purpose whatsoever to
10 anti-steering unless there is a competitor to be steered to?

11 **A.** I do.

12 **Q.** Okay. Does market power mean -- when a firm has market
13 power, does that mean that it has absolutely no competition at
14 all?

15 **A.** No. Not at all.

16 **Q.** Can you explain why that is?

17 **A.** Well, this is sometimes known as the -- as the Cellophane
18 Fallacy, but in particular, when a firm raises its -- raises
19 its price, has substantial market power, then at that point in
20 times, consumers at the margin start thinking about
21 substitutes that they wouldn't ordinarily think about in a
22 competitive market so they start thinking about, to put it
23 kind of plainly boy, this price is so high, you know, what
24 else could I possibly turn to in order to -- in order to
25 defeat it. That's a typical situation in markets with

1 substantial market power. There is always something you can
2 do. The question is whether it's an important constraint.

3 **Q.** So as a matter of economics, is there any purpose for a
4 firm that has market power to impose anti-steering rules?

5 **A.** Yes, there is. It's to prevent -- it's to prevent
6 customers from -- from seeking those other alternatives.

7 **THE COURT:** Is this a good time?

8 **MR. BORNSTEIN:** Sure, Your Honor. Although I will
9 make one observation in case it is relevant. I have just a
10 little bit left to do that we can do in open court, so if the
11 Court would like to finish that first, if that's --

12 **THE COURT:** Well, I don't know if I'm going to have
13 any redirect.

14 **MR. BORNSTEIN:** Fair enough, though.

15 **THE COURT:** Why don't we do this, though, for those
16 listening so they can take a longer break.

17 When we come back at 10:35, we will move directly into
18 sealed session.

19 What that means for those of you in the gallery is that
20 the reporters, Mr. Dave and Mr. Acton, you cannot come into
21 the courtroom for that portion.

22 The lawyer, Mr. Siegel, you are allowed to come in.

23 So we'll go straight into sealed session and take care of
24 that, and then I'll reopen the courtroom. That way we have --
25 we're not chopping it up for those in the public listening.

1 **MR. BORNSTEIN:** Very good. Thank you, Your Honor.

2 **THE COURT:** Okay. Let's take our 20-minute recess.

3 We will stand in recess.

4 (Recess taken at 10:16 a.m.)

5 (Proceedings resumed at 10:35 a.m.)

6 (Proceedings held under seal on next page.)

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1 (Proceedings under seal concluded.)

2 (Proceedings held in open Court.)

3 **THE COURT:** Ms. Stone, are we ready?

4 **THE CLERK:** I have all the audio lines now in the
5 listening.

6 **THE COURT:** Okay. We have the press back in the
7 courtroom, and the parties perhaps they are coming. Can we
8 proceed Mr. Dunn [sic]?

9 **MR. DOREN:** Yes, Your Honor.

10 **THE COURT:** Ms. Forrest?

11 **MS. FORREST:** Yes.

12 **THE COURT:** All right. Let's proceed with the
13 unsealed.

14 **MR. BORNSTEIN:** Thank you, Your Honor.

15 **REDIRECT EXAMINATION**

16 **BY MR. BORNSTEIN:**

17 **Q.** Just to follow up on a final bit of questioning that we
18 had in the sealed session, you had a discussion with the Court
19 on the subject of clustering.

20 Do you recall that?

21 **A.** I do.

22 **Q.** Do you believe this to be a case in which it is
23 appropriate to define a cluster market?

24 **A.** I do not.

25 **Q.** Can you explain why that is?

1 **A.** Yes.

2 In this particular -- in this particular case, we have a
3 particular set of conduct that applies to a set of customers;
4 the app users and app developers for the App Store. And there
5 is no distinction between how that -- how that conduct and how
6 those practices are applied, applied in that case.

7 **MR. BORNSTEIN:** Your Honor, I had a number of other
8 questions that I thought were very important when Mr. Swanson
9 was doing his examination, but with the benefit of the break,
10 I have thought better of it.

11 **THE COURT:** All right, Mr. Bornstein.

12 **MR. BORNSTEIN:** Thank you.

13 **THE COURT:** Recross.

14 **RECROSS-EXAMINATION**

15 **BY MR. SWANSON:**

16 **Q.** Dr. Evans, is it your testimony as Epic's economist that
17 the same conduct can't affect more than one market?

18 **A.** No.

19 **Q.** The conduct that's at issue here is also engaged in by the
20 three consoles, by Google Play, by Steam. You understand
21 that, don't you?

22 **A.** If by "conduct" you mean --

23 **Q.** Yes, I mean conduct; I mean the distribution conduct, the
24 alleged tying conduct.

25 **A.** Yes.

1 Q. Okay.

2 And yet you say the market should not be defined to
3 include those platforms, those competitors, correct?

4 A. No. I think we are talking about different issues --
5 (Simultaneous colloquy.)

6 Q. Can you answer my question?

7 A. Yes.

8 Q. Your position is, that the market should not be defined to
9 include any of the consoles, Google Play, or Steam, correct?

10 A. My conclusion is that those should not be in the relevant
11 market that I have defined, but not because of the issues that
12 we've just talked about. Because based on an analysis, those
13 platforms don't provide -- don't provide substitutes.

14 As a hypothetical matter, they could be in the market.
15 The question is whether they are in the market. And I have
16 concluded they are not in the market. But there's nothing in
17 my analysis in the way I've set up the approach that would
18 have prevented game consoles and PCs and browsers from being
19 in my relevant market. It's just that based on the analysis
20 that I did, I concluded that there was not sufficient
21 substitution on the part of consumers for them to be included.

22 Q. And based on your analysis, you concluded that Apple has a
23 100 percent market share, correct?

24 A. No. I -- just to be precise about it, I concluded that
25 the App Store has a 100 percent market share in iOS app

1 distribution.

2 Q. That's the question I -- sorry I didn't ask the question
3 right. But that's the answer I was looking for.

4 Thank you.

5 Thank you, Mr. Evans.

6 No further questions, Your Honor.

7 THE COURT: Anything on those three topics?

8 MR. BORNSTEIN: No, Your Honor, nothing further from
9 me.

10 THE COURT: All right. Then you're excused. Thank
11 you, sir.

12 THE WITNESS: Thank you very much, Your Honor.

13 THE COURT: Next witness.

14 MR. BYARS: Good morning, Your Honor. This is Brent
15 Byars for Epic Games which calls Ned Barnes.

16 THE COURT: Good morning.

17 MR. DOREN: Your Honor, if we can pause a moment
18 while Ms. Moyer gets to the courtroom.

19 THE COURT: Okay. Can we swear him in, Mr. Dunn
20 [sic]?

21 MR. DOREN: Yes, Your Honor.

22 THE COURT: Let's swear him in.

23 Frances, let's swear him in.
24
25

1 (NED BARNES, called as a witness for the Plaintiff, having
2 been duly sworn, testified as follows:)

3 THE WITNESS: I do.

4 THE CLERK: All right. Please be seated. Please
5 state your full name and spell your last name.

6 THE WITNESS: My name is Ned Barnes, B-A-R-N-E-S.

7 THE COURT: All right. We are going to wait a few
8 minutes here, Mr. Barnes. I wanted to make sure we could hear
9 you.

10 MR. BYARS: Your Honor, we have a binder of materials
11 if you would like us to pass it up?

12 THE COURT: Yes, please.

13 MR. BYARS: I apologize in advance for the size of
14 the binder. We didn't want to truncate the documents included
15 in it.

16 (Pause in the proceedings.)

17 THE COURT: Okay, Ms. Moye. I will let you get
18 settled. We have already sworn him in.

19 MS. MOYE: Thank you, Your Honor.

20 THE COURT: I'm counting this against Apple.

21 Mr. Doren, I'm sorry for calling you Mr. Dunn.

22 MR. DOREN: It's quite all right, Your Honor. I
23 caught on.

24 THE COURT: Are you ready?

25 MS. MOYE: I am. Thank you, Your Honor.

1 **THE COURT:** You may proceed.

2 **MR. BYARS:** Thank you, Your Honor.

3 **DIRECT EXAMINATION**

4 **BY MR. BYARS:**

5 **Q.** Mr. Barnes, what is your degree in?

6 **A.** Bachelor of Science degree in accounting from George Mason
7 University.

8 **Q.** Do you have any professional certifications or
9 credentials?

10 **A.** Yes. I am a certified public accountant. I've been
11 licensed for almost 30 years. And I am also a certified fraud
12 examiner.

13 **Q.** And what is your current line of work?

14 **A.** I am a managing director with the consulting firm of
15 Berkeley Research Group, or BRG, where I have been practicing
16 as a forensic accountant for the last 25 years.

17 **MR. BYARS:** Your Honor, I tender the witness as an
18 expert in accounting and forensic accounting.

19 **MS. MOYE:** No objection, Your Honor.

20 **THE COURT:** He's admitted.

21 **MR. BYARS:** Thank you, Your Honor.

22 **BY MR. BYARS:**

23 **Q.** Did you prepare written testimony for use in this case?

24 **A.** Yes, I did.

25 **Q.** And is there anything in your testimony you would like to

1 change?

2 **A.** No, not that I am aware of.

3 **Q.** Could you briefly describe the areas of inquiry that you
4 were assigned to conduct in this case?

5 **A.** Sure. There were principally two.

6 The first is, I was asked to investigate, analyze, and
7 report on operating profits for the Apple App Store and,
8 second, I was asked to investigate and report on operating
9 profits for certain online market places based on parameters
10 and information provided to me by Dr. Evans.

11 **Q.** And there's been some discussion this week that you may
12 have heard about operating profits and margins in this case.

13 So I wanted to first ask you from the perspective of an
14 accountant, what does operating profit mean?

15 **A.** Operating profits is basically the income that is
16 generated by a business or a business unit from its core
17 business activities. So it's the revenue less the expenses
18 that are required to generate that revenue.

19 There are principally two types of expenses that are
20 excluded from the calculation of operating income or operating
21 profits. Those are interest expense and income taxes.

22 **Q.** And what is operating margin percentage?

23 **A.** Operating margin percentage is the calculation of the
24 nominal amount, the dollar amount of operating profit or
25 income divided by the nominal or dollar amount of revenue.

1 Q. Did you see or read Dr. Schmalensee's testimony from
2 earlier in the week to the effect that operating margin is not
3 a measure of profitability?

4 A. I did see that.

5 Q. And did you see the example he gave in particular about
6 that topic of two factories, one which is highly mechanized
7 and has invested in a lot of machinery and the other who
8 hasn't invested in machinery but has hired many more workers?

9 A. I read that example in his testimony, yes.

10 Q. And would you agree with Dr. Schmalensee that the
11 mechanized factory is necessarily going to have lower
12 operating costs and, therefore, higher operating margin?

13 A. No, I disagree with that.

14 Q. Could you explain why?

15 A. Sure.

16 Principally the -- what's omitted from the example that
17 Dr. Schmalensee discussed was the very real operating expense
18 of depreciation that would be deducted for the amortization of
19 the equipment that had been purchased by the one factor in his
20 example.

21 So depreciation expense is how businesses and accountants
22 account for the investment and cost of acquiring capital
23 assets such as machinery and equipment.

24 Q. Just to make it clear, depreciation, would that be
25 included in any calculation of operating margin or profit?

1 **A.** Absolutely.

2 **Q.** Let's talk about your first area of inquiry which was App
3 Store profitability.

4 Do you recall submitting an expert report around
5 February 16 of this year?

6 **A.** I do.

7 **Q.** And did you provide estimates of the Apple App Store's
8 operating margin and margin percentages in that report?

9 **A.** I did, yes.

10 **Q.** And what were the operating margin percentages, your
11 estimates of that, that you provided in that report?

12 **A.** They were approximately 79 percent in both 2018 and 2019.

13 **Q.** And very briefly and generally, could you please describe
14 the steps that you took to generate those estimates?

15 **A.** Sure.

16 The first step was to conduct an investigation of the
17 discovery record in the case, which included the documents,
18 the business documents that had been produced by Apple, along
19 with certain discovery on this particular issue, as well as
20 depositions that had been provided -- deposition testimony
21 that had been provided by various Apple witnesses on the
22 subject.

23 That was the first step.

24 **Q.** What were the additional steps you took?

25 **A.** So from that initial investigation, I was able to identify

1 documents that set forth open -- profit and loss statements
2 for the Apple App Stores, specifically for the Apple App
3 Store.

4 Now, in connection with deposition testimony provided by
5 Mark Rollins, a corporate witness for Apple, he indicated that
6 there were certain operating expenses or certain expenses in
7 general that had not been reflected in those profit and loss
8 statements.

9 So based on his testimony, I conducted an analysis to
10 attempt to estimate these additional operating expenses to the
11 extent they were excluded from the profit and loss statements,
12 and I applied those estimates to reach my ultimate estimated
13 operating margin percentages.

14 **Q.** Did you obtain further information that was relevant to
15 your investigation after you submitted your expert report?

16 **A.** I did.

17 **Q.** And in general, could you please describe that
18 information?

19 **A.** Sure. So after my report was submitted, additional
20 documents were made available to me that were prepared by the
21 corporate finance department at Apple and delivered -- they --
22 I understand they came directly from the files of Mr. Cook.

23 So -- and they had been circulated to Mr. Cook as well as
24 the CFO of Apple. And these documents set forth Apple's own
25 internal calculations of operating margin percentage for the

1 App Store specifically, but also for every other individual
2 business unit within Apple.

3 **Q.** And what were the operating margin percentage reported in
4 this document from the App Store?

5 **MS. MOYE:** Objection, Your Honor. Those documents
6 have been deemed to be under seal. If counsel is going to
7 refer to the numbers in those documents, we need to go into a
8 sealed session.

9 **MR. BYARS:** Your Honor, the percentages I am asking
10 for were already unsealed by Your Honor's order on Mr. Barnes'
11 written direct testimony.

12 **THE COURT:** So let's be more careful, Mr. Byars. Why
13 don't you point him to his testimony, and we'll make sure they
14 are unsealed.

15 **MR. BYARS:** Sure.

16 **THE COURT:** That way no one gets in trouble.

17 **MR. BYARS:** Sure. Understood. Thank you, Your
18 Honor.

19 **BY MR. BYARS:**

20 **Q.** Mr. Barnes, could you please open to your written
21 testimony. It should be the first tab.

22 **A.** I have it open. I'm just trying to find the right
23 section.

24 **Q.** Sure. I could direct you to paragraph 2 of your written
25 direct testimony.

1 **A.** Yes, I see it there.

2 **Q.** Do you see a sentence referring to the operating margin
3 percentages that you were about to provide?

4 **A.** I do.

5 **Q.** Okay.

6 **MR. BYARS:** Your Honor, I have a copy that's on the
7 docket that is redacted that doesn't have this redaction. I
8 can show Ms. Moye, if that would be helpful.

9 **MS. MOYE:** No objection to him reading what has not
10 been redacted from the Court in his report.

11 **BY MR. BYARS:**

12 **Q.** Mr. Barnes, can you read the sentence that has not been
13 redacted related to Apple's App Store operating margins?

14 **A.** Sure.

15 "These documents show that Apple calculated its own
16 operating margin percentage for the App Store to be
17 77.8 percent for fiscal year 2019 and 74.9 percent
18 for fiscal year 2018."

19 **Q.** And was there anything about this document that was new
20 information that you didn't have when you submitted your
21 report?

22 **A.** Yes.

23 **Q.** What was that new information you obtained from these
24 documents?

25 **MS. MOYE:** Again, Your Honor, objection to any

1 discussion of those documents that have been deemed to have
2 been made under seal in open court.

3 **THE COURT:** You just have to be very precise here,
4 Mr. Byars. There's lots that I have not -- that I have sealed
5 and there's another significant amount that I have sealed.

6 So, I mean, it's not as if I don't have his testimony and
7 it's not as if we aren't publishing the written testimony that
8 is not sealed.

9 So go ahead, but let's try to make sure that I know
10 whether or not something -- his answer is going to reflect
11 something that has not been sealed.

12 **MR. BYARS:** Understand. Your Honor, may I ask him
13 about his independent analysis independent of the documents?

14 **THE COURT:** Sure.

15 **BY MR. BYARS:**

16 **Q.** Mr. Barnes, were you able to determine whether Apple had
17 allocated all costs across its business lines to each of its
18 lines of business?

19 **A.** Yes, I was able to do that.

20 **Q.** Were you able to determine that Apple had allocated costs
21 to the App Store?

22 **A.** Yes. I was able to confirm that.

23 **Q.** Were you able to compare the calculations in this document
24 to Apple's publicly reported financial statements in any
25 respect?

1 **A.** I was.

2 **Q.** And were you able to confirm that they matched?

3 **A.** Yes.

4 So when I looked at the individual, without getting into
5 numbers, when I looked at the individual revenues and expenses
6 for all of the individual business units within Apple, I was
7 able to total them up and agree to what Apple reported
8 publicly for its company-wide revenues and expenses which gave
9 me comfort and confidence that all of the revenues and all of
10 the expenses had been properly attributed to or allocated to
11 individual business units, including the App Store.

12 **Q.** Thank you, Mr. Barnes.

13 There's been some discussion of the accounting concept of
14 the joint or shared costs. Can you explain from the
15 perspective of an accountant what a joint or shared cost is?

16 **A.** Yes.

17 A joint cost or shared cost is generally an expense that
18 has benefits to more than one business unit or product line or
19 service line within an organization.

20 **Q.** And do businesses ever have occasion to allocate joint
21 costs across their lines of business?

22 **A.** Yes. That's a very common practice.

23 **Q.** In general, how do they do so?

24 **A.** Well, there are a number of methods or techniques that
25 companies may employ. It's ultimately the decision of

1 management or corporate finance to determine what is most
2 appropriate for a given type of expense.

3 It's not uncommon to see certain corporate level expenses
4 to be allocated on the basis of revenue. Sometimes there are
5 expense items that might be allocated on some other basis,
6 like head count, or assets, or some other measure.

7 **Q.** And for what purposes would businesses generally allocate
8 joint or shared costs to their business lines?

9 **A.** Well, there are a number, but certainly management --
10 management of the company and management of the individual
11 business units is an important one. And that was, you know,
12 again confirmed to me by the documents that I was able to
13 review after my report was filed, which clearly indicate that
14 Apple, itself, in the ordinary course of business was making
15 these applications in an effort to both retroactively and
16 prospectively measure the operating margin for each of its
17 individual business units, including the App Store.

18 **Q.** I would like to move to your other area of inquiry which
19 was the investigation of other online market places.

20 Can you please describe what steps you took to conduct
21 that investigation?

22 **A.** Sure.

23 So I received a request from Dr. Evans, who I understand
24 has already testified in this case, to conduct research of
25 online market places, and to report, to the extent I was able

1 to identify information, to report operating profit and
2 operating profit percentages for other online market places to
3 the extent they were 0their accounting was sufficiently
4 similar to the accounting for the App Store.

5 **Q.** And how did you determine that their accounting would be
6 sufficiently similar to the accounting for the App Store?

7 **A.** So when -- when -- when a company resells goods, including
8 digital goods like apps, there's -- there are two ways that
9 revenue can be recognized under accounting rules, what we call
10 generally accepted accounting principles or GAAP.

11 And if you think about the App Store, for example, when a
12 hypothetical app is sold for \$10 and \$7 is remitted to the
13 developer, Apple would keep the \$3 commission. Apple
14 recognizes just the \$3 of commission as revenue. That is what
15 we call revenue recognition on a net basis.

16 If you think about the alternative, if Apple were to sell
17 an app for \$10 and recognize revenue of \$10, and then report a
18 cost of sale for the \$7 that it has distributed to the
19 developer, that is revenue recognition on a gross basis.

20 So even though the net result is that Apple has \$3, the
21 method of accounting is very different. And this is not a
22 situation where Apple or any other company gets to pick
23 whichever one they want. There are criteria set forth in the
24 accounting guidelines that have to be applied to determine
25 what is the appropriate way to recognize revenue.

1 And Apple has determined that it is appropriate to
2 recognize revenue for the App Store on a revenue recognition
3 at net. And I agree with that. I fully agree that they have
4 applied the criteria properly and reached that conclusion.

5 But when I went to go investigate other online market
6 places, I wanted to limit my investigation to only those
7 market places that recognized revenue on a net basis.

8 **Q.** And was there anything else that you considered when
9 selecting the online market places from an accounting
10 perspective?

11 **A.** Well, from an accounting perspective, the other major
12 limitation was, I wanted to be able to identify firms that
13 either were predominantly operating online market places or
14 that they had sufficiently separated information on their
15 market -- online marketplace activities so that I could
16 isolate as close as I could get to just the performance of the
17 online marketplace.

18 **MR. BYARS:** Thank you, Your Honor. I tender the
19 witness.

20 **THE COURT:** Cross.

21 **CROSS-EXAMINATION**

22 **BY MS. MOYE:**

23 **Q.** Good afternoon, Mr. Barnes. I'm Veronica Moye. We
24 haven't met before. I will be doing your examination for
25 Apple today.

1 **A.** Good morning, Mr. Moye. I think it's still morning.

2 **Q.** It's actually Ms. Moye.

3 **A.** Ms. Moye. Sorry.

4 **Q.** It's not a mistake people make often.

5 I want to start by reading you some of the testimony we've
6 heard from Mr. Sweeney, the CEO of Epic. And it's about
7 accounting issues as they relate to Epic. And I want, in your
8 expert accounting opinion, for you to let us know do you agree
9 with those positions that Mr. Sweeney has taken.

10 So, first, on May 4th at trial, Mr. Sweeney was asked:

11 "And any effort to attribute the cost of developing
12 shared technology to a particular product, use, or
13 customer would be largely artificial, correct?"

14 Mr. Sweeney's answer was:

15 "Yes, that is my view of accounting at Epic."

16 Do you agree, sir, that any effort to attribute the cost
17 of developing shared technology to a particular product use or
18 customer of Epic would be artificial?

19 **A.** I have not investigated how Epic internally accounts for
20 its operations, so I don't -- I can't really speak to that
21 issue because it's not something that was within the purview
22 of my investigation.

23 **Q.** So you don't know; is that correct, sir?

24 **A.** Right. I would have to study the information at Epic and
25 make that determination. But I was asked to investigate what

1 Apple does.

2 Q. You don't have any reason to doubt the truthfulness of
3 Mr. Sweeney's testimony, do you?

4 A. That's not my role here.

5 Q. Do you have any reason to doubt the truthfulness of
6 Mr. Sweeney's testimony, sir?

7 A. No, I certainly don't.

8 Q. Mr. Sweeney also testified as follows:

9 "Question: And you also believe that any effort to
10 attribute the cost of developing shared technology to
11 a particular product, use, or service would be
12 arbitrary, true?"

13 "Answer: Yes. Very much within Epic."

14 Do you agree that at least with respect to Epic, any
15 effort to attribute the cost of developing shared technology
16 to a particular product, use, or service would be arbitrary?

17 A. Again, that's not something that I've investigated so I
18 don't have an opinion one way --

19 Q. You don't know, sir; is that correct?

20 You don't know? Is the answer you don't know?

21 A. It is not something I've studied.

22 Q. And Mr. Sweeney testified:

23 "Question: Mr. Sweeney, if someone were to point at one
24 product or service that your company offers, and declare a
25 precise profit margin for it, that assessment would be

1 fundamentally flawed, wouldn't it?"

2 "Answer: Yes, within most parts of Epic, that's correct."

3 You also do not know whether you agree with that
4 testimony; is that correct, sir?

5 **A.** That's not something I've studied, so that would be
6 correct.

7 **Q.** And because you did not study the issue, you don't know
8 whether you agree with this testimony also:

9 "Question: And Epic does not organize around
10 isolated business units, does it?

11 "Answer: No, Epic does not.

12 "Question: And Epic does not make decisions around
13 business units, correct?

14 "Answer: Correct."

15 You don't have any opinion or any knowledge to dispute
16 that testimony, do you?

17 **A.** That's correct. It was outside the scope of my analysis.

18 **Q.** In your expert opinion, is there anything improper about
19 Epic's decision not to organize around isolated business units
20 and not to make decisions around business units?

21 **A.** Well, I have not reached an opinion -- an expert opinion
22 on that issue, so I can't --

23 **Q.** So you don't have an opinion as to whether that's improper
24 or not, sir?

25 **A.** I do not have an opinion on that, an expert opinion.

1 Q. Okay.

2 Mr. Sweeney testified as follows:

3 "And Epic does not maintain any business unit or
4 product level P&Ls, correct?

5 "Answer: I think the accounting team does that to a
6 certain extent.

7 "Question: I am sorry, sir, I didn't hear you.

8 "Answer: I believe our accounting team does that to
9 a certain extent, but not systematically everywhere."

10 In your expert accounting opinion, Mr. Barnes, is there
11 anything improper about Epic's decision not to systematically
12 maintain business unit or product specific P&Ls?

13 A. I don't have any expert opinion on that as I sit here
14 today.

15 Q. So as you sit here today you do not intend to testify that
16 that is improper on Epic's part?

17 A. No.

18 Q. And Mr. Sweeney testified as follows:

19 "Question: And they don't allocate expenses in any
20 systematic way, correct?

21 "Answer: My understanding is we do not attempt to
22 allocate shared engineering cost to particular
23 products.

24 "Question: Rather, Epic operates holistically as a
25 company that pursues the wide range of opportunities

1 you see?

2 "Answer: Yes."

3 "And you pursue those opportunities with as much
4 synergy and sharing of technology and tools and
5 people and processes as possible, correct?

6 "Answer: Yes."

7 Is there anything improper about Epic's decision to
8 operate holistically, sir, in your opinion?

9 **A.** That's not an issue that I've investigated --

10 **Q.** You don't know whether it's improper or not? You have no
11 opinion on that?

12 **A.** I don't have an opinion.

13 **Q.** And Mr. Sweeney testified:

14 "Question: And you find that to be a good way to run
15 a business, don't you?

16 "Answer: Absolutely.

17 "Question: People are not focused on their business
18 unit P&Ls, for example.

19 "Answer: Yes.

20 "Question: Focused on innovation rather than how
21 they personally are they and their business unit are
22 performing?

23 "Answer: Yes.

24 "Question: And you want your people focused on
25 innovation, not on their own skins, and I mean that

1 literally, or on the P&L of their own work, correct?

2 Mr. Sweeney's answer was "yes."

3 Do you agree with Mr. Sweeney's testimony that adopting an
4 approach where people are focused on innovation rather than
5 their own business unit P&Ls is a good way to run a business?

6 **A.** That was a lot of testimony, but I would just say I would
7 defer to Mr. Sweeney for those issues --

8 **Q.** I'm asking you for your opinion as an expert here today.

9 Do you agree that it's a good way to run a business to
10 focus on innovation rather than business unit P&Ls?

11 **A.** Ms. Moye, I only provide expert opinions on issues --

12 **Q.** I need you to directly answer the questions that I put to
13 you, sir. If you don't have an opinion, it's fine to say so.

14 So, Mr. Barnes, you are sitting here today as an
15 accounting expert for Epic. Do you have an opinion as to
16 whether or not it's a good way to run a business to focus on
17 innovation rather than business unit P&Ls?

18 **A.** That's not -- I don't have an expert opinion on that
19 issue.

20 **Q.** You don't have an opinion; is that correct?

21 **A.** I believe that's what I just said.

22 **Q.** Now let's talk about the P&L calculations that you did for
23 the App Store.

24 Now it's correct that Apple witnesses have also testified
25 that Apple doesn't maintain P&L statements that identify

1 operating margins for its App Store in the ordinary course of
2 business; isn't that correct? You've seen that testimony?

3 **A.** I have seen that testimony.

4 **Q.** But you decided to calculate what you refer to as the
5 operating margin for the App Store; is that correct, sir?

6 **A.** I did, and Apple did as well.

7 **Q.** All I need is an answer to my question.

8 **A.** I did.

9 **Q.** To the extent you need to explain something, your counsel
10 will allow you to do so.

11 You made that calculation; is that correct?

12 **A.** I did provide calculations, yes.

13 **Q.** You started those calculations with two internal Apple
14 documents. And I think they are labeled PX602 and 608 in the
15 case. I can provide you copies if you need it.

16 **A.** I am generally familiar with the document, but if you want
17 to talk about specifics, I might need to see them.

18 **Q.** I don't need to talk about specifics. I just need your
19 confirmation that you started your calculation with two
20 documents that had been generated by Apple.

21 **A.** I don't --

22 **Q.** Let me be clear, sir. I'm talking about the calculation
23 that led to the 79.6 margin percentage that you testified
24 about in direct. In order to get to that number, you started
25 with two documents that Apple employees had created; is that

1 right?

2 **A.** I started -- I can try -- I can try and explain the
3 documents I referred to --

4 **Q.** I don't need an explanation, sir.

5 I am asking you, did you start with two documents?

6 **A.** I did start with Apple documents. I don't remember there
7 being two.

8 **Q.** And based on your professional experience, you believe the
9 documents you started with were consistent with P&Ls prepared
10 on a fully burdened basis; is that correct?

11 **A.** That is correct.

12 **Q.** And the term "fully burdened" means the margins reflected
13 in those documents include consideration of all identifiable
14 direct costs as well as allocation of indirect or shared costs
15 that provide benefit to the business at issue.

16 Is that the correct definition, sir?

17 **A.** That sounds reasonable.

18 **Q.** Do you have any doubt as to whether that is the correct
19 definition? I'm reading your quote from your written direct,
20 paragraph 7, page 4 if you need to refer to it.

21 **A.** It sounds reasonable.

22 **Q.** Let's look at your written report. Let's go to paragraph
23 7. It's on page 4.

24 Would you please read the last sentence of paragraph 7,
25 sir?

1 **A.** Are you referring me to my report or my direct testimony?

2 **Q.** Your written direct testimony.

3 **A.** Okay.

4 I'm sorry, can you tell me the paragraph again?

5 **Q.** Paragraph 7 on page 4.

6 I am asking you to read into the record the last sentence
7 of paragraph 7. It starts, "In accounting and in my
8 testimony."

9 **A.** Sure. I can read that.

10 **Q.** Thank you.

11 **A.** (reading)

12 "In accounting and in my testimony, the term 'fully
13 burdened' describes the determination of operating
14 margins that include all identifiable direct costs as
15 well as an allocation of indirect or shared costs
16 from which the relevant business or business segment
17 derives benefit."

18 **Q.** And that testimony that you have written and submitted to
19 the Court is correct, is it not?

20 **A.** Certainly. I certainly believe it's correct, yes.

21 **Q.** It's more than reasonable, it's correct, in your view; is
22 that right?

23 **A.** It's correct.

24 **Q.** Thank you.

25 But even though you believed these documents you started

1 with contained fully burdened P&Ls, you decided to actually
2 look at some witness testimony about the documents; isn't that
3 right?

4 **A.** I did.

5 **Q.** And specifically you relied on the testimony of Mr. Mark
6 Rollins who, in his deposition, testified that the two
7 documents he started with did not reflect a fully burdened
8 allocation; is that right?

9 **A.** That was his testimony.

10 **Q.** You made two adjustments to the operating margins
11 reflected in the two documents you started with; is that
12 right?

13 **A.** I think there were a couple -- there were more than two
14 but I made some adjustments that lowered the operating
15 margins.

16 **Q.** Would you please look at page 6, paragraph 11 of your
17 written direct?

18 **A.** Okay.

19 **Q.** The second sentence in paragraph 11 says:

20 "Specifically, I performed two adjustments to the
21 operating margins for fiscal year 2019 and fiscal
22 year 2018 reflected in the App Store P&L statements."

23 Do you see that?

24 **A.** I do see that.

25 **Q.** That's a truthful statement, correct, sir?

1 **A.** It is. One of those requires --

2 **Q.** I didn't ask for an explanation, sir. I asked for you to
3 answer my question.

4 **A.** Okay.

5 **Q.** Now, you accepted Mr. Rollins' testimony because you
6 understood that you were not assessing the credibility of
7 Apple's fact witnesses; isn't that correct, sir?

8 **A.** Can you repeat that question? I'm sorry.

9 **Q.** Is it not correct that you accepted Mr. Rollins' testimony
10 because you understood that you were not assessing the
11 credibility of Apple's fact witnesses; isn't that correct,
12 sir?

13 **A.** It's certainly the case that I was not assessing the
14 credibility of Apple's fact witnesses.

15 **Q.** Thank you, sir. That answers my question.

16 And so the two adjustments you made, the first was to add
17 three categories of expenses Mr. Rollins testified had been
18 admitted; is that right, sir?

19 **A.** Correct.

20 **Q.** And the second was to increase App Store expenses by an
21 additional amount of general corporate expenses; is that
22 correct, sir?

23 **A.** That is correct.

24 **Q.** And you tried to follow as best you could Mr. Rollins'
25 testimony in performing your calculations is not that correct,

1 sir?

2 **A.** The methodology that he explained, yes.

3 **Q.** Let me ask you again.

4 You tried to follow as best you could Mr. Rollins'
5 testimony in performing your allocations; is that correct,
6 sir?

7 **A.** I would agree with that.

8 **Q.** But isn't it correct, sir, that Mr. Rollins did not
9 testify that the categories of expenses you made adjustments
10 for were the only App Store expenses that had not been
11 allocated in the documents you started with.

12 **A.** I don't recall that.

13 **Q.** Okay. Let's have you look at Rollins deposition and see
14 if it helps you recall it.

15 (Pause in the proceedings.)

16 If you would look at -- I'm sorry, this is actually your
17 deposition, Barnes deposition.

18 Paragraph [sic] 75 Lines 5 to 14, Your Honor.

19 **THE COURT:** Okay. Hold on. I was going to Rollins.

20 **MS. MOYE:** It's Mr. Barnes' deposition.

21 **THE WITNESS:** I don't see -- did you say paragraph?

22 **MS. MOYE:** No. I said Barnes deposition, page 75,
23 Lines 5 to 14.

24 **THE COURT:** Okay.

25 All right. I'm not seeing impeachment.

1 **MS. MOYE:** I'm sorry?

2 **THE COURT:** I'm not seeing the impeachment.

3 **MS. MOYE:** I'm sorry, Your Honor. I am having
4 difficulty understanding.

5 **THE COURT:** I said I'm not seeing the impeachment he
6 said he tried to follow.

7 **MS. MOYE:** Yes. I'm sorry, I was giving you the
8 wrong cite again, Your Honor.

9 It's Rollins dep 216, starting at Line 9. And same for
10 you.

11 And the question I had posed, Your Honor, was:

12 Mr. Rollins did not testify that the categories expenses
13 you made adjustments for were the only App Store expenses that
14 had not been allocated in the documents you started with.

15 I would like to refer the witness to Rollins' deposition,
16 216, starting at Line 9 going to 217 at Line 1.

17 **THE COURT:** So we are back to the Rollins deposition.

18 **MS. MOYE:** We are back to the Rollins deposition. I
19 apologize for the confusion.

20 **THE COURT:** Mr. Barnes, go to the Rollins deposition,
21 page 216.

22 Are you there?

23 **THE WITNESS:** Yes, Your Honor, I'm there.

24 **THE COURT:** Okay.
25

1 **BY MS. MOYE:**

2 **Q.** And, Mr. Barnes, you see there that Mr. Rollins testifies
3 as follows, starting at line 9.

4 "And just going -- I understand that, but to go back to my
5 question. Beyond the examples you gave, Worldwide Develop
6 Relations, OCox (phonetic), Opex, the marketing we discussed,
7 and the corporate level expenses, did they identify any other
8 expenses that they felt should have been attributed to the App
9 Store P&L?

10 "Answer: Sitting here right now, I can't recollect any
11 other ones. But I don't --

12 "Question: Who are those conversations?

13 "Answer: I think I asked that specific question to the
14 team. And so there may certainly be certain line items that
15 might have been excluded, and so I guess sitting here right
16 now, I'm not -- I can't think of additional -- any specific
17 line items sitting here right now."

18 Do you see that testimony?

19 **A.** I do.

20 **Q.** Does that cause you to recall that Mr. Rollins testified
21 that there may have been others; that, in fact, what he was
22 listing were those that came to mind sitting here right now.

23 **A.** I don't read it that way, but I think he provided a pretty
24 comprehensive list.

25 **Q.** You do see that he says: "I can't think of additional --

1 any specific line items sitting here right now."

2 You see those words?

3 **A.** I do see those words.

4 **Q.** You considered Mr. Rollins' testimony in doing your work;
5 isn't that right?

6 **A.** I did.

7 **Q.** And you took Mr. Rollins testimony as true because, again,
8 you are not assessing the credibility of witnesses; isn't that
9 right?

10 **A.** That is true.

11 **Q.** But you made only the two adjustments to increase expenses
12 related to the App Store that we have already discussed; isn't
13 that right?

14 **A.** I made the adjustments that we've discussed that are set
15 forth in my report.

16 **Q.** Those two that we discussed here this morning, right?

17 **A.** One of them is three, but -- so -- but, yes, there are two
18 categories. There's actually four adjustments.

19 **Q.** Okay.

20 And isn't it correct, Mr. Barnes, that if you had made
21 even more adjustments to account for additional categories of
22 App Store expenses, the number you calculated would have
23 decreased.

24 **A.** I would be speculating. I don't know that.

25 **Q.** I'm asking you a math question. As an accounting expert

1 here, Mr. Barnes, if the level of expenses attributed to the
2 App Store were higher than what you did, wouldn't the margin
3 decrease?

4 **A.** If you hold everything else constant and all you do is
5 increase expenses, then the operating margin percentage will
6 go down. That is math.

7 **Q.** Thank you, sir.

8 Let's talk about the new documents that you referenced in
9 your testimony. And you said those new documents confirmed
10 your conclusions; is that correct?

11 **A.** That's one of the things they did, yes.

12 **Q.** And you believe those documents you say "indicate," I
13 think was the word, that Apple employs a systematic method for
14 allocating its expenses to the App Store.

15 Is that what you said, sir?

16 **A.** That is correct.

17 **Q.** That's your direct testimony?

18 **A.** Yes.

19 **Q.** Now, isn't it correct that you have reviewed no witness
20 testify about these Apple documents?

21 **A.** I have not seen any testimony related to these documents.

22 **Q.** And so you have seen no testimony explaining why these
23 documents were created; is that right?

24 **A.** I have not seen any testimony related to why they were
25 created.

1 Q. You have not seen any testimony explaining how these
2 documents were used, have you, sir?

3 A. Not testimony, no.

4 Q. And you have not seen any witness testimony explaining how
5 often these types of documents were created, have you?

6 A. I have not seen any testimony, no.

7 Q. What you are referring to -- what you refer to in your
8 report is three documents; is that correct?

9 A. I don't -- it was several. I don't recall if it was
10 specifically three.

11 Q. Okay. I will help you with that.

12 I will come back to it.

13 So you haven't seen -- look at paragraph 14, page 8 of
14 your written direct. The second sentence from the bottom of
15 that page says:

16 "I reviewed three documents prepared by Apple's corporate
17 FP&A group that contained profitability analyses specific to
18 the App Store. Do you see that language, sir?

19 A. I'm still trying to get there. I am sorry.

20 Q. Okay. Tell me when you're ready.

21 A. I see there's a reference here to three. I don't know if
22 that is all the documents I reviewed.

23 Q. But you do know that that statement is true; that you
24 reviewed three documents prepared by Apple's corporate FP&A
25 group that contained profitability analyses specific to the

1 App Store; that is true, is it not?

2 **A.** True. The documents that contained profitability of the
3 App Store, yes.

4 **Q.** And then if we look at paragraph 15 on the next page,
5 there's a statement: These documents confirm my conclusions.

6 Do you see that, sir?

7 **A.** I see that.

8 **Q.** So those three documents confirmed your conclusion; is
9 that right, sir?

10 **A.** Again, I don't necessarily agree --

11 **Q.** Can you answer my question, sir? I'm not asking about
12 what you agree with.

13 Did those three documents that you reference in your
14 report confirm your conclusions?

15 **A.** I -- as asked, I don't know.

16 **Q.** You don't know. But you do know that the statements in
17 your written direct are correct -- are true. You know that?

18 **A.** Yes. I think you may be miss --

19 **Q.** I didn't ask you for your thoughts, sir.

20 Epic's counsel will give you every opportunity to share
21 any thoughts they think are germane to your testimony.

22 Now, you don't know how the documents were used. You
23 don't know how often these types of documents were prepared.

24 Are those of those correct, sir?

25 **A.** I don't necessarily agree with that statement.

1 Q. I am talking to you, sir, about the three documents that
2 confirm your conclusions. Are you with me?

3 A. Yes.

4 Q. Okay. And have you seen any testimony about those three
5 documents?

6 A. Testimony, no.

7 Q. And that's what I was asking you.

8 Have you seen any testimony explaining how those three
9 documents were used?

10 A. I have not seen any testimony.

11 Q. And you have seen no testimony explaining how they were
12 prepared, correct?

13 A. Have not seen any testimony.

14 Q. And you have seen no testimony explaining who actually
15 reviewed those documents or for what purpose.

16 A. Not testimony.

17 Q. And you have not seen any testimony explaining whether the
18 margins reflected in those documents had been prepared on a
19 fully-burdened basis, the type of testimony that you saw from
20 Mr. Rollins with respect to the other documents we talked
21 about earlier.

22 A. I haven't seen testimony on that.

23 Q. And if an Apple witness was to testify that these three
24 documents that confirm your conclusion did not reflect a
25 fully-burdened allocations of cost, you would have to accept

1 that as true just as you did for Mr. Rollins' testimony, would
2 you not, sir?

3 A. No, that would be incorrect.

4 Q. So you are assessing the credibility of Apple witnesses?

5 A. I'm not assessing the credibility, but that statement
6 would be incorrect.

7 Q. And you believe that you would be able, you, Mr. Barnes,
8 would be able to determine with no testimony for these three
9 documents that they had been developed on a fully-burdened
10 basis; is that your testimony, sir?

11 A. I have done that.

12 Q. You have done that?

13 A. Yes, ma'am.

14 Q. So you have done an assessment that allows you to
15 determine which cost in Apple are properly allocated to the
16 App Store?

17 A. I have been able --

18 Q. Answer my question, sir.

19 Have you, Mr. Barnes, done an assessment of which cost at
20 Apple are properly allocated to the App Store?

21 A. I believe so, yes.

22 Q. You believe you have?

23 A. Yes.

24 Q. And can you point me to where you have given that opinion
25 here in your report?

1 Have you ever worked at Apple, sir?

2 **A.** You want me to answer the first question?

3 **Q.** Yes.

4 Actually, withdraw that. Let me ask you a second one.

5 Have you ever worked at Apple?

6 **A.** I have never -- I've never been employed at Apple, no.

7 **Q.** Do you know the level of cost that Apple incurs for
8 research and development?

9 **A.** Generally, yes.

10 **Q.** Do you know how those costs benefit its different business
11 segments?

12 **A.** I know how Apple treats them, yes.

13 **Q.** I asked what you do, sir.

14 You feel that you know -- you have told us that you have
15 done a calculation that shows that the allocations in these
16 three newly produced documents are, in fact, correct.

17 Isn't that the testimony you gave us?

18 **A.** That's a different question than you asked me. But I've
19 been able to determine that they are on a fully-burdened
20 basis.

21 **Q.** So let me ask you a different question then, sir. Perhaps
22 I wasn't clear.

23 Have you done any assessment that would enable you to
24 opine to this Court under oath that all of the cost
25 attributable to the App Store have been properly allocated to

1 the App Store in these newly produced documents?

2 **A.** I don't know specifically --

3 **Q.** Answer my question, sir.

4 Do you need it back?

5 **A.** No, I'm trying to answer it actually.

6 I don't know -- the question, as you've asked it, I don't
7 know.

8 **Q.** So you haven't done that assessment, right? And you can't
9 do that assessment, right?

10 **A.** I don't have access to the underlying detail that backs up
11 these data.

12 **Q.** Thank you, sir.

13 Now, let's talk about your online market places work. You
14 were asked by Dr. David Evans, another Epic expert, to
15 identify certain businesses that operate online market places;
16 is that right, sir?

17 **A.** To identify them and report on operating margins, if
18 available.

19 **Q.** And Dr. Evans gave you the definition of online market
20 places to use; is that correct?

21 **A.** He did.

22 **Q.** And I think I heard you explain in your Direct testimony
23 that you felt it was important to identify online marketplaces
24 that use what you refer to as "net basis accounting;" is that
25 correct, sir?

1 **A.** That's correct for their online marketplace activities.

2 **Q.** And companies that actually take title to goods and resell
3 them are using a different kind of accounting.

4 What did you refer to it as, sir?

5 **A.** That is called gross -- revenue recognition on a gross
6 basis.

7 **Q.** And Dr. Evans gave you some criteria and you identified
8 five companies: eBay, Etsy, Alibaba, Mercado Libre, and
9 Rakuten. I hope I'm pronouncing it right.

10 Are those the five that you identified?

11 **A.** Yes. I believe it's Rakuten. The only caveat I would
12 give you is two of them. I identified individual segments
13 within those companies.

14 **Q.** But you did not make any effort to ensure that the
15 companies you identified were comparable to the App Store; is
16 that right, sir?

17 **A.** Comparable in what sense?

18 **Q.** Comparable in the sense that term was used in your
19 deposition testimony, sir.

20 **A.** Comparability in terms of the nature of the business was
21 not within the scope of my work. I was only trying to ensure
22 that there was a consistency of accounting.

23 **Q.** You did not, sir, conduct a search for online marketplaces
24 that are comparable to the App Store; is that right?

25 **A.** That's true.

1 Q. So you instead calculated operating margins for companies
2 using a definition that Dr. Evans gave you; is that right?

3 A. Dr. Evans provided me with the parameters, the initial
4 parameters, yes.

5 Q. You used those parameters to identify the companies?

6 A. Correct.

7 Q. You did not conduct a search for comparable online
8 marketplaces.

9 A. I was not -- I was not --

10 Q. Yes or no, sir. Did you conduct a search for comparable
11 online marketplaces.

12 A. That was not part of my analysis, no.

13 Q. Does that mean no?

14 A. Correct.

15 Q. Okay.

16 And that means you did not calculate operating margins for
17 companies that facilitate transactions for apps or in-app
18 purchases; is that right, sir?

19 A. That's true. That was a criteria.

20 Q. You did not attempt to calculate an operating margin for
21 the Google Play store; is that right?

22 A. My recollection is that Alphabet was one of the companies
23 that I did look at, but that their Google stores did not have
24 sufficiently separable information.

25 Q. My question, again, was, did you calculate an operating

1 margin for the Google Play store, not did you try, did you do
2 so?

3 **A.** I did not, no.

4 **Q.** Did you calculate an operating margin for the Sony
5 PlayStation store?

6 **A.** No, I did not.

7 **Q.** Did you calculate an operating margin for the Microsoft
8 Store?

9 **A.** I did not.

10 **Q.** Did you calculate an operating margin for the Samsung
11 Galaxy Store?

12 **A.** I did not.

13 **Q.** And did you calculate an operating margin for Nintendo
14 eShop?

15 **A.** I did not.

16 **Q.** And each of those companies actually facilitate app and
17 in-app transaction; isn't that correct, sir?

18 **A.** That's not something --

19 **Q.** If you don't know, it's fine. Do you know?

20 **A.** I don't know as I sit here today. It sounds like
21 something they would do but it's not something I studied.

22 **Q.** You don't know one way or the other?

23 **A.** I haven't studied it.

24 **Q.** The reason you did not calculate operating margins for
25 those other stores is because they don't report separate

1 financial results for their App Store activities just like
2 Apple does not; isn't that correct, sir?

3 **A.** One of the -- one of the criteria for selecting an online
4 market place for me was --

5 **Q.** I did not ask you what your criteria were for selecting an
6 online marketplace. Let me ask you the question again.

7 The reason you did not calculate an operating margin for
8 Google Play Store, Sony PlayStation Store, Microsoft Store,
9 Samsung Galaxy Store, and Nintendo eShop is because those
10 companies do not report separate financial results for their
11 App Store activities just as Apple does not; is that correct?

12 **A.** I'm struggling with the last part of that question. I
13 don't know what that -- the importance of that, of the last
14 little --

15 **Q.** I didn't ask you how you felt about the question, sir.
16 I'm trying to get your factual testimony here.

17 Let's look at your written direct. Let's look at page 13,
18 paragraph 24.

19 Please read paragraph 24, sir.

20 **A.** Sure.

21 "A number of firms with operations that facilitate
22 transactions for apps or in-app purchases including
23 the Google Play Store, Sony PlayStation store,
24 Microsoft store, Samsung Galaxy store and Nintendo
25 eShop do not meet the criteria because they do not

1 report sufficiently separate financial results for
2 their app store activities.

3 Q. That was truthful, sir, isn't it?

4 A. That is.

5 Q. That is truthful?

6 A. Correct.

7 Q. And Apple also does not report separate financial results
8 for its Apple App Store; isn't that correct?

9 A. Not publicly.

10 Q. Yes. Are you aware, sir, that Apple operates a hardware
11 business in addition to the App Store?

12 A. Yes.

13 Q. Does Ebay operate a hardware business?

14 A. I don't believe so.

15 Q. Does Etsy, another of the companies that you calculated
16 margins for, does it operate a hardware business?

17 A. I don't believe see.

18 Q. What about the remaining three, Alibaba, Mercado Libre,
19 and Rakuten -- hope I got it right that time. Do they operate
20 a hardware business?

21 A. I don't think so. I would probably need to go back and
22 double-check on Rakuten, but I don't think so.

23 Q. Sir, is it correct that you are not offering an opinion on
24 the comparability of any of the other firms that you did these
25 operating margins for eBay, Etsy, Alibaba, Mercado Libre, and

1 Rakuten.

2 **A.** That's true.

3 **Q.** Thank you.

4 Thank you. Pass the witness.

5 **THE COURT:** Redirect.

6 **REDIRECT EXAMINATION**

7 **BY MR. BYARS:**

8 **Q.** Mr. Barnes, I would like to speak first about what
9 Ms. Moye described as the lack of testimony about the
10 documents you obtained later.

11 Do you know why there's a lack of testimony about those
12 documents in the record so far?

13 **A.** My understanding is they were produced to Epic on the last
14 day of discovery in this case.

15 **Q.** I'd also like to talk about the documents themselves.
16 Very general level without getting into any detail.

17 Was there information in these documents that you used to
18 consider whether -- for what purpose they were prepared by
19 Apple?

20 **A.** Yes.

21 **MR. BYARS:** I would like to refer you to PX2391. We
22 can start on the first page and probably end on the first
23 page two.

24 **MS. MOYE:** This, Your Honor, is a document that is
25 under seal.

1 **THE COURT:** Okay. We will be careful.

2 2391.

3 **MR. BYARS:** 2391.

4 **THE WITNESS:** I'm there.

5 **BY MR. BYARS:**

6 **Q.** And I only want to ask you the very general question
7 whether this page contains information relevant to any
8 investigation of whether this document was used for business
9 purposes?

10 **A.** Yes, it does.

11 **Q.** Ms. Moye also asked you whether you had information about
12 the ways in which expenses such as R&D were allocated.

13 Do you remember that?

14 **A.** I do.

15 **Q.** Was there information in these documents that allowed you
16 to consider the way in which Apple allocated expenses such as
17 R&D?

18 **A.** Yes, there was. Both allocation and just attribution for
19 direct R&D.

20 **Q.** Thank you for that clarification.

21 Could you please look at, again, we are going to talk
22 about it very generally, PX2385.

23 **A.** Okay. I'm there.

24 **Q.** And if you could please turn to page 24. That's 2835.24
25 which is actually 19 in the presentation.

1 **MS. MOYE:** And, again, for the record, 2385 has also
2 been sealed by the Court in prior rulings.

3 **THE COURT:** All right. Be careful.

4 (Plaintiff's Exhibit 2385 was received in evidence.)

5 **MR. BYARS:** Understood. Thank you, Your Honor.

6 **BY MR. BYARS:**

7 **Q.** I only want to ask whether this page depicts the ways in
8 which Apple allocates both direct, shared -- I'm sorry, I'll
9 withdraw that.

10 I only want to ask whether this page depicts the way in
11 which Apple assigns costs, whether they be direct, shared, or
12 allocated costs across its line of business.

13 **MS. MOYE:** Objection, foundation.

14 **THE COURT:** Let's do it -- there is a lack of
15 foundation, but you can ask him an open-ended question.

16 **MR. BYARS:** Thank you, Your Honor.

17 **BY MR. BYARS:**

18 **Q.** What does this page depict from an accounting perspective
19 and based on your experience as an accountant and a forensic
20 accountant?

21 **THE COURT:** How about what did he use -- did he use
22 this page?

23 Let's start there.

24 **BY MR. BYARS:**

25 **Q.** Mr. Barnes, did you use this page in forming your

1 opinions?

2 **A.** I did.

3 **Q.** And what -- how did you use this page in forming your
4 opinions?

5 **THE COURT:** Again, generically.

6 **THE WITNESS:** This was one of a number of pages that
7 was indicative that Apple was employing a rigorous analytic
8 method to determine how costs should be either identified to
9 specific business units or allocated if they were shared
10 across multiple business units.

11 **THE COURT:** That's what it meant to you?

12 **THE WITNESS:** Yes, ma'am -- yes, Your Honor.

13 **THE COURT:** Okay. Go ahead.

14 **BY MR. BYARS:**

15 **Q.** And because it may not be clear, is there a category on
16 the right-hand side, without getting into any details, that
17 would include the Apple App Store based on your investigation
18 of these documents?

19 **A.** Yes.

20 **MS. MOYE:** Objection, again, foundation.

21 **THE COURT:** Did you -- well, tell me what -- because
22 you don't have foundation, all that is relevant is what it is
23 that you understood it to be for yourself because you're
24 not -- there is no testimony and you are not an Apple
25 employee. So that's all you can really say.

1 **MR. BYARS:** If I can ask a clarifying question, Your
2 Honor?

3 **THE COURT:** Okay.

4 **BY MR. BYARS:**

5 **Q.** Were you able, in your investigation, to determine in
6 which of these categories on the right-hand side would have
7 included the Apple App Store?

8 **A.** Yes, I was.

9 **Q.** How were you able to do that?

10 **A.** The apps -- this document, which shows the allocation of
11 costs, has figures on the right-hand side that go into
12 different product and service line buckets.

13 And I was able to reconcile those internally with other
14 documents -- other pages of this presentation to ascertain
15 with a very high confidence level where the App Store's cost
16 allocations were flowing.

17 **Q.** Mr. Barnes, if you could please direct the Court to one of
18 those other pages.

19 **A.** So I would direct the Court to the pages that end in dot
20 11 and dot 12.

21 **Q.** Let's start with 12, and maybe we can end there.

22 What information does this page depict at a very high
23 level of generality?

24 **A.** So, for the fiscal year 20, which is a forecast period,
25 this shows the breakdown of Apple's services lines of

1 businesses between revenue, gross margin, operating expenses,
2 and operating margin.

3 **Q.** How are you able to use this information to determine in
4 which category on the other page of the App Store would be
5 included in.

6 **A.** Without referring to specific numbers, I was able to tie
7 out boxes that refer to operating expenses for services in
8 this page to the flow chart that appears on the page ending in
9 dot 24 for one of the categories that show in the allocation
10 of expenses.

11 **Q.** And for the non-accountants in the room, can you please
12 explain how you tie something out?

13 **A.** Tying something out is just simply an accountant's term
14 for taking two sets of data, adding up the numbers, and
15 getting them to agree, which gives you confidence that you've
16 accounted for everything.

17 **THE COURT:** You said 2385 dot 11 and 2385 dot 12?

18 **THE WITNESS:** Yes. And I think, Your Honor, you can
19 actually just use dot 12 to do what I need to do.

20 **BY MR. BYARS:**

21 **Q.** Is that because page 12 is services?

22 **A.** Yes. Page 12 is services, so we can short circuit having
23 to go through the products.

24 **Q.** Thank you.

25 **MR. BYARS:** You can put that away.

1 **BY MR. BYARS:**

2 **Q.** Ms. Moye referred to a series of testimony given by
3 Mr. Sweeney regarding Epic's practices. Does that affect your
4 opinion with respect to what Apple has done or is capable of
5 doing.

6 **A.** No. It has no effect.

7 **Q.** Why is that?

8 **A.** Well, as I testified, I wasn't investigating how Epic does
9 its internal reporting. And -- but I was investigating
10 Apple's internal reporting of the Apple App Store. And I was
11 able to determine, based on documents I reviewed, that both I
12 was able to do my own estimate based in combination with the
13 testimony of Mr. Rollins, but perhaps more importantly I was
14 able to verify that Apple does this internally in the ordinary
15 course of business.

16 **Q.** Just to make the record clear, did you perform any
17 additional estimates or calculations with respect to the later
18 produced documents that we were just looking at?

19 **A.** I did not do any adjustment to those documents.

20 **MR. BYARS:** Pass the witness, Your Honor.

21 **MS. MOYE:** No further questions.

22 **EXAMINATION**

23 **THE COURT:** Going to dot 24, I take it you were
24 looking at the iPhone number?

25 **THE WITNESS:** No, Your Honor. I was looking at the

1 last item on the right-hand corner.

2 **THE COURT:** Okay.

3 **THE WITNESS:** I can clarify what I mean by that.

4 **MR. BYARS:** Your Honor, may we read the name of just
5 the category into the record just for clarity?

6 **THE COURT:** I think it's pretty obvious on the
7 document.

8 **MR. BYARS:** Okay. Thank you, Your Honor.

9 **THE COURT:** I'll have to go back and look at your
10 math in your report. Thank you.

11 Anything else?

12 **MS. MOYE:** No, Your Honor.

13 **MR. BYARS:** No, Your Honor.

14 **THE COURT:** You may step down.

15 Next witness.

16 **MS. MOSKOWITZ:** Good morning. Lauren Moskowitz for
17 Epic Games. Epic calls Peter Rossi.

18 **THE COURT:** Good morning.

19 **THE CLERK:** If you can stand and I will swear you in.

20 (PETER ROSSI, called as a witness for the Plaintiff,
21 having been duly sworn, testified as follows:)

22 **THE WITNESS:** I do.

23 **THE CLERK:** Please be seated. And then you want to
24 be sure that's underneath the shield. And please state your
25 full name and spell your last name.

1 **THE WITNESS:** Yes. My full name is Peter Eric Rossi.
2 My last name is spelled R-O-S-S-I.

3 **THE COURT:** Good afternoon, sir.

4 **THE WITNESS:** Good afternoon.

5 **THE COURT:** You may proceed, Ms. Moskowitz.

6 **MS. MOSKOWITZ:** Thank you, Your Honor. May I
7 approach with some binders?

8 **THE COURT:** You may.

9 **DIRECT EXAMINATION**

10 **BY MS. MOSKOWITZ:**

11 **Q.** Good morning, Professor Rossi.

12 **A.** Good morning.

13 **Q.** Have you prepared a written direct testimony for today?

14 **A.** Yes, I have.

15 **Q.** If you can turn to your binder in the beginning there, can
16 you confirm that that is your written direct testimony?

17 **A.** Yes, it is.

18 **MS. MOSKOWITZ:** Your Honor, I offer exhibit expert
19 three, Professor Rossi's written direct into evidence.

20 **THE COURT:** Are we still dealing with any sealing
21 issues at all?

22 **MS. MOSKOWITZ:** There is one redacted sentence in
23 that that will be subject to a motion to seal.

24 **THE COURT:** Is it agreed upon?

25 **MS. MOYE:** That's agreed upon, yes, Your Honor.

1 **THE COURT:** What sentence?

2 **MS. MOSKOWITZ:** It is on the bottom of page, I
3 believe, 13 and 14. I'm just going to confirm that. It's
4 highlighted in your binder, and I just have to find it.

5 **THE COURT:** My binder doesn't have page numbers.
6 Do you have a paragraph number?

7 **MS. MOSKOWITZ:** 49, Your Honor. It starts "for
8 example" on the bottom.

9 **THE COURT:** Okay. I'll look for it. I don't need an
10 extra motion on that topic, and it's admitted.

11 **MS. MOYE:** Thank you, Your Honor.

12 **MS. MOSKOWITZ:** Your Honor, just one other
13 administrative matter in connection with Professor Rossi.

14 There are a number of documents that are included in this
15 binder that the parties weren't able to get a stipulation done
16 in time. If I could read those in and move for their
17 admission at once, if that would be amenable to Your Honor?

18 **THE COURT:** That's fine.

19 **MS. MOSKOWITZ:** There is PX2545, which is a flash
20 drive of the actual survey results. PX2547, PX1085, which is
21 subject to a motion to seal and contains some of the same data
22 that was referred to in that sentence that Your Honor just
23 read. PX1086, PX1087, PX1088, PX1089, PX1090, PX1091, and
24 PX1092.

25 I move those into evidence, Your Honor.

1 **THE COURT:** Ms. Moyer?

2 **MS. MOYE:** No objection to that, Your Honor. We do
3 just note there's a redaction issue with PX1085. Column C
4 will need to be redacted on that document, but I think the
5 parties have reached agreement on that.

6 **THE COURT:** Okay. This is the -- I'm looking at it
7 now. And it's not highlighted on my version. Is it just the
8 third column?

9 **MS. MOYE:** It is, Your Honor. It's column C the
10 caption there and the numbers underneath it.

11 **THE COURT:** Okay. That's sealed. And with that
12 sealing, the exhibits are admitted.

13 (Plaintiff's Exhibits 2545, 2547, 1085 - 1092 received in
14 evidence)

15 **MS. MOSKOWITZ:** Thank you, Your Honor.

16 **DIRECT EXAMINATION**

17 **BY MS. MOSKOWITZ:**

18 **Q.** Professor Rossi, can you just briefly summarize your
19 background and qualifications for the Court?

20 **A.** Yes.

21 I teach at U.C.L.A. and I do research and teach in the
22 areas of survey methodology, statistics, marketing, and
23 economics. And I've been doing that for about 35 years.

24 **Q.** And even though Your Honor told us we didn't have to, I
25 don't want to be the odd one out and not do it.

1 I tender Professor Rossi in the field of -- as an expert
2 in the field of survey methodology and statistics for this
3 matter.

4 **MS. MOYE:** No objection.

5 **THE COURT:** He's admitted.

6 **BY MS. MOSKOWITZ:**

7 **Q.** Professor Rossi, did you prepare a set of demonstratives
8 for your testimony today?

9 **A.** Yes, I did.

10 **Q.** For the record, PDX0091 for identification will be used.

11 Professor Rossi, what was your assignment in this case?

12 **A.** My assignment was to consider undertaking a survey to
13 measure the reactions of consumers to a 5 percent increase
14 across the board in a certain class of products on the Apple
15 iStore, in-app purchases and prescriptions which I refer to as
16 "at issue purchases" in my report.

17 **Q.** What did you conclude?

18 **A.** I concluded that it would be possible to undertake such a
19 survey, but it would require the use of a hypothetical
20 scenario and that would follow in the long tradition of using
21 hypotheticals successfully in surveys, both in commercial and
22 litigation applications. But that the real challenge would be
23 to design a survey that would yield reliable data.

24 **Q.** Why is a hypothetical appropriate here?

25 **A.** Because there does not exist marketplace transactional

1 data that could be used to answer this question about what
2 happen in across-the-board price increase over a large number
3 of products.

4 **Q.** How did you go about designing the hypothetical scenario
5 in this case?

6 **A.** Well, on this slide I display the process. And the
7 process really is to respond to the challenge of creating a
8 scenario that can be expressed to respondents in a meaningful
9 way. And that starts with qualitative research. That is,
10 before we even draft a questionnaire, we undertake qualitative
11 research and we go through a sequence of pretesting.

12 During that process, I came to realize that the best way
13 that I know to make ground -- to make the hypothetical
14 meaningful to respondents would be to ground it in their
15 actual purchase experience on the App Store.

16 So in order to do that, we asked respondents to go into
17 the Apple App Store app, go to the purchase history feature,
18 and actually enter the relevant transactions from that history
19 into the survey, collect them as part of the survey.

20 And having done that, we realize that we needed a test, if
21 you will, we call it a reliability test, to ensure that they
22 are reliably and conscientiously entering that data.

23 Now, we devised a test in which we ask them to undertake a
24 similar task on their iOS device, could be a phone or an
25 iPad, in which they would go and look up what's called the

1 model number. So for example, an iPhone 7 is not a model
2 number, it's a model name. Most people don't know, including
3 myself before this survey, didn't know the model number.

4 So we asked them to complete that task. And we terminated
5 any respondent who cannot successfully pass that test.

6 **Q.** And you said that you collected actual purchase data from
7 your respondents. Over what period of time did you ask those
8 respondents to report their at-issue purchases?

9 **A.** Over a 30-day period.

10 **Q.** Why did you pick that period?

11 **A.** For two basic reasons. In survey research, we can only
12 ask so much of respondents. And my experience is that we ask
13 them to go back to a further point in time, say back 60 days
14 or 90 days. That would require them to enter quite a few more
15 transactions, and the quality of that data would be
16 compromised. So we picked 30 days as a reasonable starting
17 off point.

18 Also, and I think this is very important, many people view
19 their interactions with financial transactions on a monthly
20 basis. We pay a monthly phone bill or a monthly mortgage
21 bill. So that frame of timing is appropriate in my judgment.

22 **Q.** So let's take a look at the actual hypothetical scenario
23 that you used.

24 Can you describe the scenario you designed?

25 **A.** Absolutely. This would be displayed on the screens for

1 all of the respondents to see. And this is the outcome of
2 this rather extensive process that I've just discussed.

3 I would like to call --

4 **THE COURT:** Can you tell me very quickly, what time
5 of the year did you take this?

6 **THE WITNESS:** The survey was administered in January
7 of this year.

8 **THE COURT:** So you're talking about -- when you are
9 talking about the 30-day period, you're asking them to think
10 about December?

11 **THE WITNESS:** I believe the survey was administered
12 from January, late January. So it would be the last 30-day
13 period. So whenever they are taking the survey. So I'm
14 taking the survey on say on January 27th, I would go back 30
15 days from the 27th. So that could go into December for some
16 respondents. That's correct.

17 **THE COURT:** A month after the holidays.

18 **THE WITNESS:** Correct.

19 **THE COURT:** All right. Proceed.

20 **THE WITNESS:** So I just want to call your attention
21 in this example in the middle of the screen is a box and
22 calling the respondent's attention to it.

23 You can see there is the grounding in their actual
24 experience. In this example, their last 30 days amount was
25 \$4.04 as an example, and then we tried to express the price

1 increase which is a 5 percent increase in terms they can
2 understand. What would that mean if they were to make the
3 same purchases. That's one very important part of the
4 scenario.

5 The other important part of the scenario is to establish
6 what's changing in this hypothetical world and what's not
7 changing. So what's changing is the prices of the at-issue
8 products. What's not changing are the prices outside of that
9 App Store environment; namely, for example, the prices on the
10 Google Play Store for an Android application or on websites
11 where someone, at least for some applications, may be able to
12 purchase -- do in-app purchases for an app on a website. So
13 those things are held constant if you will.

14 Finally, this whole scenario is designed to evoke a longer
15 run price response, not a transitory price response.

16 **Q.** Why do you view this scenario as invoking a long run or
17 non-transitory price increase?

18 **A.** Really for three reasons. If you look at the wording of
19 the scenario, so we say at the very beginning, starting 30
20 days ago, the Apple App Store increases these prices
21 5 percent, we don't give a termination date. So starting but
22 not finishing.

23 Similarly, when we discuss the external environment, we
24 say the prices remain the same without a termination date.
25 That's one reason.

1 The second reason is, in this scenario, we are actually
2 giving people -- we are stating to them that the price of all
3 of these products is going to increase.

4 In the real world, if, for example, Apple were to increase
5 the commission rate, so that would create a price increase,
6 it's unlikely they would announce that to be public.

7 So how would a consumer find out about it or infer about
8 it? They would have to interact with the App Store and notice
9 that prices weren't increasing not just for one product or two
10 products, but for all across the board. And so that would
11 take them some time. So that's the second reason why this is
12 designed for a longer run price response.

13 And the other that I always should recognize and I think
14 all good survey experts recognize is that consumers bring
15 their own experience with products into the survey. And in
16 consumer products, price increases are not temporary. They
17 are more longstanding.

18 **Q.** So is there a reason you did not include the word
19 "permanent" somewhere in this scenario?

20 **A.** Yes. That would be, in my judgment, poor survey practice.
21 In other words, you should not include as part of -- any part
22 of your survey ambiguous terms. Permanent is a very ambiguous
23 term. It means many things -- different things to different
24 people.

25 **Q.** Let's talk about how you went about implementing this

1 scenario.

2 Can you describe the process from there?

3 **A.** Yes. We posed the scenario to the respondent. The
4 respondent then gets to see the scenario a second time.
5 That's the screen being displayed now. And then we asked the
6 respondent a series of follow-up questions on how they would
7 react to that scenario.

8 And here you can see there are three alternatives down
9 there in the gray box areas. The first alternative is: We
10 asked them, will they make the same purchases that they made
11 in that 30-day period they were asked to enter their data in.

12 And the first option is, yes, I would make the same
13 purchases and then, of course, since prices increase, the
14 amount of spending would have to increase. Those people we
15 call, a stickers, meaning they are staying with their
16 purchases. And at that point, we require no more information
17 from them, they are terminated from the survey.

18 **THE COURT:** Can I ask you, how you dealt with the
19 fact that during the holidays prices are always lower and in
20 January prices always go up. Consumers know that.

21 How did you deal with that.

22 **THE WITNESS:** Prices for Apple apps on the App Store
23 or more generally?

24 **THE COURT:** More generally.

25 **THE WITNESS:** Yes.

1 I have actually written about that problem, about prices
2 being lowered at holiday periods. That, I don't think,
3 applies to this class of goods. We are talking about their
4 purchases being entered primarily in the January period, post
5 holiday period.

6 **THE COURT:** So you don't think that consumers
7 generally have a view that prices increase in January after
8 the holidays of December?

9 **THE WITNESS:** I don't know that that applies to this
10 class of products.

11 **THE COURT:** That wasn't my question.

12 My question is, do you think that consumers believe that?

13 **THE WITNESS:** I think for some products they may.

14 **THE COURT:** Have you done any research about whether
15 consumers believe that for these products?

16 **THE WITNESS:** No, I have not.

17 **THE COURT:** Proceed.

18 **THE WITNESS:** Okay.

19 The second option there is that they would change their
20 purchases in some way to achieve a lower total spending.

21 Those are people we call decrementers. And then we follow
22 up with them to see how they would achieve that decrement in
23 their spending. So the questions continue for them.

24 Finally, as in good survey practice, we do offer a "not
25 sure" so we don't force people to make a decision. If someone

1 says they are not sure, they are terminated at that point from
2 the survey.

3 **Q.** Just let me pause and ask a follow-up question on what the
4 Court just asked you.

5 In terms of when you were collecting information on actual
6 purchase spending and then presenting that same amount with
7 the 5 percent increase, does the period for the month of the
8 year that that occurred impact the results or your conclusions
9 from the survey?

10 **A.** I don't believe so.

11 **Q.** Why not?

12 **A.** Because we're talking about a shift in price, we are
13 talking about response to an increase in price, not a level of
14 price from a specific baseline level.

15 **Q.** So in terms of -- for the individuals that you mentioned
16 would continue on, the individuals who answered that they
17 would change their purse and spend less, how did the survey
18 then proceed for them?

19 **A.** Then we proceed to the next question, which is really
20 designed to inquire more about how they would change those
21 expenditures.

22 So if we can see the next slide please.

23 The next question is really designed to get at would
24 people shift some of their purchases away to a new device.
25 That's the third option there.

1 Q. In terms of this question, question 17, was it important
2 from your perspective to present every possible option that a
3 respondent might have to spend less in this question?

4 A. No. The main purpose of this question is to filter out or
5 obtain information about people who would use a new device,
6 and it's not necessary -- the other options essentially are
7 distracter options.

8 Q. So after question 17, what followed? What were you doing
9 in the remainder of the survey?

10 A. So there's two inputs from this survey that bear on a
11 profitability calculation. One is, of course, their overall
12 revenue response. How do they decrement there -- overall how
13 they decrement their spending, in response to the price
14 increase.

15 And the other is the extent of switching to new devices.
16 So the remainder questions are designed to elicit that
17 information.

18 Q. So the first one you mentioned was measuring reductions
19 and spending. How did you go about measuring that?

20 A. Yes. If we can look at the next slide, please.

21 (displayed on screen.)

22 That's question 18. Here we reiterate the scenario in
23 terms they can understand. And we ask them: You've told us
24 that you would decrement your spending. By how much? And
25 they enter an amount.

1 **MS. MOSKOWITZ:** Your honor, I think I have one more
2 question that will be before a new topic. If I have that 30
3 seconds?

4 **THE COURT:** You've got two minutes.

5 **MS. MOSKOWITZ:** Okay.

6 **BY MS. MOSKOWITZ:**

7 **Q.** How did you go about measuring the second part of the
8 profitability analysis, the percentage of switchers?

9 **A.** We asked Question 19, which we can -- thank you.

10 And the purpose of that is to understand -- people who
11 were asked, 19, are decrementers who have indicated that they
12 would consider shifting purchases to a new device, and we're
13 basically to ask them in 19 which kind of device.

14 The key issues there are -- or the key responses, I should
15 say, are the non-ios, non-ipad/iphone devices, another tablet
16 or phone.

17 **BY MS. MOSKOWITZ:**

18 **Q.** So let's talk about results.

19 What did the survey show you about how consumers would
20 react to a 5 percent price increase of at-issue purchases?

21 **A.** Yes. So the total sample size is about 2600. As I
22 mentioned in question 16, we did offer the option to say I'm
23 not sure. So the people who were able to make it either a yes
24 or no option there, are called deciders. There are about 2300
25 of them in this survey.

1 Then the deciders are divided into two groups, those
2 people who would stick with the same purchases, but pay the
3 larger amount, and those who would decrement. Those
4 proportions are about 81 percent -- what we are calling
5 stickers and 19 percent decrementers.

6 That key share of switching, the switchers are the people.
7 Why is that important for a profitability calculation is
8 because if I shift out of an iOS device, Apple doesn't receive
9 the stream of profits from that device over its useful
10 lifetime.

11 And that -- the share of switchers is about 1.3 percent of
12 those deciders. So there are 2300 are odd, deciders, 1.3
13 percent switch out of the iOS system, if you will. Overall
14 spending reduction is about 11 percent.

15 And some people like to put that into the units of an
16 elasticity which is a reduction per one percentage point price
17 increase, and the elasticity estimate here is about minus 2.2.

18 **THE COURT:** Good?

19 **MS. MOSKOWITZ:** Yes.

20 **THE COURT:** All right. Let's go ahead and take our
21 second break. We'll stand in recess until 1:15.

22 (Luncheon recess was taken at 12:36 p.M.)

23 (Proceedings resumed at 1:17 P.M.)

24 **THE CLERK:** Remain seated. Court is in session.
25 Come to order.

1 **THE COURT:** Okay. We're back on the record.

2 The record will reflect that the parties are present. The
3 witness is on the stand.

4 But I have Mr. Doren at the mic. Sir.

5 **MR. DOREN:** Thank you, Your Honor.

6 Just -- just one quick matter. When Dr. Rossi was being
7 examined, various exhibits were offered for admission. And
8 the parties have been working on a stip -- on various
9 stipulations regarding the materials being relied upon by
10 experts. As this Court knows, you've received two
11 stipulations. You've entered one of them. And those have
12 been coming in batches, if you will.

13 We had understood that the -- this final stipulation had
14 been completed. However, over the break, we learned that the
15 stipulation related to Dr. Rossi, as well as the remaining
16 Epic witnesses, as well as our remaining experts has not yet
17 been completed. So our request would simply be, Your Honor,
18 that the documents admitted with Dr. Rossi be provisionally
19 admitted subject to the completion of the stipulation which is
20 how the parties have been trying to eliminate any issues
21 related to any exhibits related to the experts.

22 **THE COURT:** Ms. Forrest.

23 **MS. MOSKOWITZ:** Your Honor, if I may.

24 **THE COURT:** Are you involved in the overall?

25 Because --

1 **MS. MOSKOWITZ:** With respect -- I know enough about
2 it, but either as Your Honor --

3 **THE COURT:** Okay.

4 **MS. MOSKOWITZ:** -- prefers.

5 **THE COURT:** Go ahead.

6 **MS. MOSKOWITZ:** It is correct that these have been
7 happening in batches. Professor Rossi is taking the stand
8 here before one is entered and will step down before one is
9 entered. And so I understood that there were no objections as
10 to Professor Rossi. And I was uncomfortable with not offering
11 or laying a foundation if there were objections, of which
12 there are none, to any of those exhibits.

13 And so while I certainly -- we are still negotiating and
14 happy to reach a resolution on the remaining experts,
15 Professor Rossi is here and I don't want a later fight about
16 some other expert to then re -- have an issue with Professor
17 Rossi after he's testified.

18 **THE COURT:** I think that's legitimate. But I can
19 always just overrule Apple if they tried that. And I think
20 what's probably best is to just acknowledge and respect the
21 process that both sides have been using. So they will be
22 admitted, but they shouldn't be put in a box until we have the
23 next stipulation.

24 **MS. MOSKOWITZ:** Certainly happy to keep them off the
25 box, Your Honor.

1 **THE COURT:** Okay.

2 **MR. DOREN:** And thank you, Your Honor. And of
3 course, I mean, for example, there are still materials related
4 to Dr. Evans who is done testifying that are still being
5 negotiated. So that has been the process for witnesses who
6 have left the stand as it is -- should be with Dr. Rossi.

7 **THE COURT:** That's fine. We can just continue on the
8 same process so that they're coming in in batches.

9 **MR. DOREN:** Thank you, Your Honor.

10 **THE COURT:** All right. Proceed.

11 **MS. MOSKOWITZ:** Thank you, Your Honor.

12 **Q.** Good afternoon, Professor Rossi.

13 **A.** Good afternoon.

14 **Q.** We left off after you had concluded describing your
15 results.

16 Do you recall that?

17 **A.** Yes, I do.

18 **MS. MOSKOWITZ:** If we could also have PDX0091 back on
19 the screen, Mr. Rudd.

20 (Exhibit published.)

21 **BY MS. MOSKOWITZ:**

22 **Q.** Could you describe to the Court how you went about
23 ensuring that the results of your survey could reliably be
24 used to say anything about the target population beyond your
25 sample.

1 **A.** Yes. Yes. So I subjected --

2 **Q.** Let me interrupt you. I'm sorry, Professor Rossi.

3 **MS. MOSKOWITZ:** Mr. Rudd, could you please turn to
4 PDX0091.10. Thank you.

5 **Q.** I'm sorry. Please continue.

6 **A.** Yes, as I stipulate in my reports, I subjected the survey
7 data to a whole battery of tests for its reliability and
8 projectability. I just want to call the attention to two.

9 We're using a sample here to project to a population. And
10 that means that we have to establish -- in my opinion as a
11 survey expert, we have to establish the representatives of
12 that sample.

13 And we've done so in two ways using external sources of
14 validation which is quite unusual in my experience in surveys.
15 One is an RBC, Royal Bank of Canada, survey of iPhone
16 ownership by model. And we compare that to the distribution
17 of iPhone usage in our survey, and they correspond quite
18 closely.

19 The other is we were able to compare the distribution of
20 the expenditures that were recorded for the last 30 days via
21 respondents to the distribution of expenditures for the same
22 class of products on the Apple App Store. All consumers. And
23 those distributions agree very closely.

24 So I believe that establishes representativeness to a high
25 standard.

1 Once you establish representativeness, the next thing you
2 should do as a survey expert would be to establish the
3 statistical reliability of your conclusions. Remember the two
4 conclusions that are most germane here are the overall revenue
5 reduction and the percentage of switchers.

6 This sample size of over 2300 respondents is more than
7 five times the sample sizes that I see in practice in academe
8 and in the commercial spheres. And as a result of that very
9 large sample, representative sample, we have a very low margin
10 of statistical error.

11 So for all of these reasons, I believe that this survey
12 provides a very reliable measure of response and -- and is
13 held to very high standards, at least in my experience, in the
14 academic, commercial, and litigation spheres.

15 Q. Thank you, Professor Rossi.

16 **MS. MOSKOWITZ:** Your Honor, no further questions.

17 **THE COURT:** Cross.

18 **CROSS-EXAMINATION**

19 **BY MS. MOYÉ:**

20 Q. Good afternoon, Dr. Rossi.

21 A. Good afternoon.

22 Q. I am Veronica Moyé. We haven't met before. I'm going to
23 be doing your examination today on behalf of Apple.

24 Let's start by talking about the various versions of your
25 survey instrument.

1 Is it correct, Dr. Rossi, that you prepared a number of
2 different drafts of your questionnaire before you settled on a
3 final survey?

4 **A.** Yes, as is customary in survey research.

5 **Q.** And for your first draft questionnaire, you conducted what
6 you referred to as an unstructured pretest; is that correct?

7 **A.** We did conduct such a pretest before the first
8 questionnaire draft, yes.

9 **Q.** And --

10 **A.** Excuse me, I'm sorry. With the first draft.

11 **Q.** And during that what you call unstructured pretest for the
12 first draft, you had a experienced mediator engaged in
13 conversation with the respondents as they completed the
14 survey; is that correct, sir?

15 **A.** That's correct.

16 **Q.** And during what you call an unstructured pretest, there's
17 an in-depth interview; is that also correct, sir?

18 **A.** Yes, that's part of the process, yes. You're describing
19 an in-depth interview, yes.

20 **Q.** And what you call an unstructured pretest is designed to
21 eliminate ambiguities or misunderstandings and to ensure that
22 the survey respondents understand the questions being asked
23 and answer them accurately. Is that correct?

24 **A.** Yes. I believe that's correct.

25 **Q.** Your initial draft survey questionnaire had the following

1 hypothetical price increase scenario.

2 **MS. MOYÉ:** If we could have that on the screen.

3 Question 16 in the initial draft.

4 **THE COURT:** We'll switch it over.

5 (Demonstrative published.)

6 **MS. MOYÉ:** I'm sorry?

7 **THE COURT:** I was -- I was talking to your -- I was
8 talking to Mr. Eltiste.

9 **BY MS. MOYÉ:**

10 **Q.** And if we could highlight for Dr. Rossi the language that
11 starts "this scenario description should be displayed with
12 each question that follows," the language in the box.

13 **A.** Yes. Yes, I see that.

14 **Q.** Okay.

15 And this is a copy of the question from your initial
16 draft; is that right, sir?

17 **A.** I believe it is. At least one of the previous drafts.

18 **Q.** Okay. And the question here, the draft -- the initial
19 draft for question 16, the question was "The prices of in-app
20 purchases from the Apple App Store have increased by
21 5 percent. You told us that your in-app purchases were about,
22 and you put in a number, to less than, you put in another
23 number, are approximately, and you put in a final number,
24 during the past 30 days. This price increase means that in
25 the future, you'd be spending about -- and again you

1 calculated the number -- more each month or, the number, more
2 each year on your in-app purchases.

3 Do you see that language?

4 **A.** I do see that language, yes.

5 **Q.** And so the initial draft survey, it asked about a
6 hypothetical price increase; is that right?

7 **A.** It did.

8 **Q.** And in this initial draft, you were asking the survey
9 respondents what they would do in response to a hypothetical
10 price increase in the future; is that right?

11 **A.** That is correct.

12 **Q.** And is it also correct, sir, that you believe that when
13 you did this what you called unstructured pretest phase, you
14 eliminated ambiguities in that language and you ensured that
15 respondents interpreted questions as you intended.

16 **A.** Yes. It was to inform a process of revising the
17 questionnaire with that aim, yes.

18 **Q.** And you obtained feedback during what you called the
19 unstructured pretest, and that's again a phrase where
20 moderators engage in conversations with respondents. During
21 that phase you obtained feedback and you used it to modify the
22 questions moving forward; is that right?

23 **A.** In part, that's correct, but also other pretest
24 information, yes.

25 **Q.** Okay.

1 And during that unstructured pretest, as you call it, you
2 determined that there were aspects of your initial draft that
3 respondents found confusing or unclear; isn't that correct?

4 **A.** That is correct.

5 **Q.** Then after that initial draft, you created three
6 additional versions of your survey, version one, version two,
7 and version three; is that right, sir?

8 **A.** That is correct.

9 **Q.** Now, with respect to version one, version two, and version
10 three, you did something different. You didn't do the
11 unstructured pretest. You did what you call structured
12 pretest; is that right, sir?

13 **A.** That's correct.

14 **Q.** And is it correct, sir, that the term "structured pretest"
15 is not a term generally used in your industry?

16 **A.** Yes, as I said that in my report. I --

17 (Simultaneous colloquy.)

18 **BY MS. MOYÉ:**

19 **Q.** And in fact --

20 **A.** -- to explain that it was.

21 **Q.** Try to stay with me and answer my questions. Okay,
22 Dr. Rossi?

23 **A.** I am.

24 **Q.** Okay.

25 And in fact, you had never used a structured pretest in

1 any survey work you did prior to the work you did in this
2 case; is that correct, sir?

3 **A.** Not in exactly this way, that's correct, because I did not
4 have this --

5 **Q.** Sir --

6 **A.** -- kind of survey.

7 **Q.** -- I'm asking you a straightforward question.

8 Had you ever used what you call a structured pretest in
9 any survey work you did prior to your work on this case?

10 **A.** No, I had not.

11 **Q.** Thank you, sir.

12 And during the what you call structured pretest, you
13 administered these new versions of the survey, version one,
14 version two, version three, correct?

15 **A.** That is correct. After those structured pretests, yes.

16 **Q.** And in those structured pretests, there were no interviews
17 or conversations with experienced moderators; isn't that
18 correct, sir?

19 **A.** That is correct.

20 **Q.** And version three was the final version, the version that
21 you actually used to get the survey reports that you're
22 testifying about here today; is that right?

23 **A.** That's correct.

24 **Q.** And your final version included the following hypothetical
25 price increase.

1 **MS. MOYÉ:** If we could have the screenshot of
2 question 16 in the final.

3 (Demonstrative published.)

4 **BY MS. MOYÉ:**

5 **Q.** So the question in the final survey instrument you used
6 is: Imagine that starting 30 days ago, the Apple App Store
7 increased the prices of all IAPs subscriptions by 5 percent,
8 you told us that your spending on IAPs subscriptions during
9 the past 30 days was, you input an amount. The higher prices
10 mean that the same purchases would have instead cost you, and
11 you put in a higher amount.

12 Nothing else about apps or IAP subscriptions has changed.
13 Prices at the App store, e.g., Google Play Store, all websites
14 remain the same.

15 And then you say: Thinking about the same 30-day period,
16 would you have made the same purchases of IAPs subscriptions
17 from the Apple App Store with the higher prices?

18 That's the question as put in your final survey; is that
19 right, sir?

20 **A.** That's correct. We just went over that. That's right.

21 **Q.** So in the final survey, you also asked about a
22 hypothetical price increase; is that right?

23 **A.** That's correct.

24 **Q.** But in the final survey, you asked about a hypothetical
25 price increase that happened in the past; is that right, sir?

1 **A.** In the most recent past, yes, and going forward into the
2 future.

3 **Q.** Are the words "going forward into the future" in
4 question 16?

5 **A.** No, they're not. But as I --

6 **Q.** That's all I asked, you, sir.

7 **A.** Yes, sir -- yes, ma'am.

8 **Q.** And with respect to this final survey, version three,
9 there was no testing done where experienced moderators were
10 engaged in conversations or interviews with the survey
11 respondents; is that correct, sir?

12 **A.** No. I believe that all the versions were informed by the
13 initial instruction.

14 **Q.** I didn't ask you what was informed by the initial. I
15 asked you with respect to version 3 of the survey --

16 **A.** Yes.

17 **Q.** -- is it not correct, sir, that there were there was no
18 testing done where experienced moderators were involved in
19 interviews or conversations with the survey respondents?

20 **A.** Prior to version 3?

21 **Q.** Let me try again. Stay with me. Okay?

22 **A.** I am staying with you.

23 **Q.** I didn't say prior to. On version 3 itself, during what
24 you call the structured pretest, there were no conversations
25 or interviews of survey respondents; isn't that correct, sir?

1 **A.** That's correct. The structured pretest is not --

2 **Q.** Thank you, sir. I got your answer.

3 Again, Epic's counsel will give you an opportunity to
4 explain anything that they think is material.

5 You understand that --

6 **A.** I appreciate that.

7 **Q.** -- don't you?

8 Now, while we have question 16 up, let me ask you a couple
9 more questions about it.

10 First, sir, is it correct that the purpose of your survey
11 work was to elicit the reactions of U.S. consumers to a
12 permanent 5 percent increase in the price of in-app purchases
13 and subscriptions when purchased from within iOS apps?

14 **A.** I'm not sure I used the word "permanent" in my assignment.
15 I think I used the word "long run" or "nontransitory," but I'm
16 not sure.

17 **Q.** Okay. Would you look at your written direct, sir. Do you
18 have that in front of you?

19 **A.** Oh, I do. Just one second.

20 **Q.** Look at paragraph 2 of your written direct.

21 **MS. MOYÉ:** Your Honor, I have copies of the documents
22 for the Court as well.

23 **THE COURT:** Yeah, I have the report.

24 **MS. MOYÉ:** You have his written direct.

25 **THE COURT:** Yes.

1 **MS. MOYÉ:** Thank you.

2 **THE COURT:** Do you --

3 **BY MS. MOYÉ:**

4 **Q.** Would you read --

5 **MS. MOYÉ:** I'm sorry?

6 **THE COURT:** Do you have the slides? Do you have a
7 copy of slides for me by any chance?

8 **MS. MOYÉ:** I do in the binders as well, Your Honor.

9 **THE COURT:** Okay. I would take that and I'll --

10 (Pause in the proceedings.)

11 **BY MS. MOYÉ:**

12 **Q.** Now, this written direct testimony is true; is it not,
13 sir?

14 **A.** Yes, it is.

15 **Q.** It remains true today?

16 **A.** Yes, it does.

17 **Q.** Okay. Let's please read the second sentence in
18 paragraph 2 on page 4.

19 **A.** Yes.

20 I conducted a survey to elicit reactions of U.S.
21 consumers to a permanent 5 percent increase in the
22 price of in-app purchases and subscriptions when
23 purchased from within iOS apps.

24 **Q.** Thank you, sir.

25 And let's look back at question 16. Is the word

1 "permanent" in the question?

2 **A.** I'm sorry. Is there a question pending? I'm sorry. I
3 couldn't hear you.

4 **Q.** Yes.

5 **THE COURT:** Is there a "permanent" in the question.

6 **THE WITNESS:** No, there's not.

7 **BY MS. MOYÉ:**

8 **Q.** Thank you, sir.

9 And now let's compare the initial draft survey question 16
10 to the question that ended up in the final.

11 **MS. MOYÉ:** If we could have that initial draft on the
12 screen.

13 (Demonstrative published.)

14 **BY MS. MOYÉ:**

15 **Q.** Now in the initial draft of question 16, you had the
16 language: This price increase means that in the future, you'd
17 be spending about, a specific amount more, each month or,
18 another specific amount more, per year on your in-app
19 purchases. You see that language, sir?

20 **A.** I do.

21 **Q.** And there is not language like that in the final version
22 question 16; is that correct?

23 **A.** That is correct.

24 **Q.** And in this question 16, let's go back to the final
25 question 16.

(Demonstrative published.)

BY MS. MOYÉ:

Q. After you posited the hypothetical scenario, you emphasize: Thinking about the same 30-day period, would you have made the same purchases of IAPs subscriptions from the Apple App Store with the higher prices; is that right, sir?

A. That is correct.

Q. Does your final survey ask about changes in prices for initial app downloads?

A. Initial app downloads, no.

Q. It does not.

Now, Mr. Weissinger, the VP of marketing at Epic, has provided the following testimony.

And this is May 10th trial transcript.

He testified as follows:

"Q. Okay. So if we were to say that your kind of core demographics are boys to men from 13 to 25, would you agree with that statement?

"A. Yes, I would."

Do you accept that testimony from Mr. Weissinger as true, sir?

A. I can't verify, but I take your word that that is his testimony.

Q. I asked you if you accept his testimony as true, sir?

A. I haven't seen any research on their demographics.

1 Q. I asked you if you accept his testimony as true, sir?

2 A. It's an assertion. I can't evaluate its truthfulness.

3 Q. So you don't know whether Mr. Weissinger was telling the
4 truth or not?

5 A. Whether it's based on hard data or not, I don't.

6 Q. I didn't ask you whether it was based on hard data. Let
7 me try again.

8 Do you have any reason to believe that Mr. Weissinger made
9 a misrepresentation to this Court when he testified that
10 Epic's core demographic was boys to men 13 to 25.

11 MS. MOSKOWITZ: Objection.

12 THE COURT: What's the objection?

13 MS. MOSKOWITZ: Argumentative and irrelevant.

14 THE COURT: Objection to the form is sustained.

15 BY MS. MOYÉ:

16 Q. Do you know what Epic's core demographic is, sir?

17 A. No, I do not.

18 Q. And you didn't find that to be relevant for purposes of
19 your assignment?

20 A. My assignment was not a gaming survey.

21 Q. My question to you was did you find that to be relevant
22 for purposes of your assignment?

23 A. No, I do not.

24 Q. Thank you.

25 Now, if it was true that the core demographic for Epic was

1 13 to 25, if Mr. Weissinger's testimony were accepted as true,
2 is it also correct that your survey only targeted those age 17
3 and older?

4 **A.** That is our targeted population, that is correct.

5 **Q.** And the target population is the segment of the population
6 whose characteristics the survey is designed to represent; is
7 that right?

8 **A.** That's correct.

9 **Q.** So your survey is designed to represent those age 17 and
10 older; is that right?

11 **A.** It -- that is the target population. But I also have
12 evidence that it can be projected to -- to a larger population
13 regardless of age.

14 **Q.** I didn't ask you about what other evidence you had, sir.
15 I asked you was your target population 17 and older?

16 **A.** Yes, it was.

17 **Q.** And does that mean that your survey results are designed
18 to represent those age 17 and older?

19 **A.** It certainly is, but it may represent others.

20 **Q.** And your survey then, if Mr. Weissinger's testimony is
21 taken as true, your survey does not represent those from ages
22 13 to 16 who are within Epic's core demographic; is that
23 right, sir?

24 **MS. MOSKOWITZ:** Objection. Continue to object to the
25 tying to Mr. Weissinger.

1 **THE COURT:** Overruled.

2 **THE WITNESS:** I'm sorry. Could you repeat the
3 question? I apologize.

4 **BY MS. MOYÉ:**

5 **Q.** Yes.

6 If -- if Mr. Weissinger's testimony is accepted as true
7 that the core demographic for Epic is boys to men age 13 to
8 25, isn't it also correct that your survey only captured those
9 17 and up?

10 **A.** Only people over 17 are in my survey. That does not mean
11 it can't be used --

12 **Q.** Thank you.

13 **A.** -- for other purposes.

14 **Q.** I didn't ask you about other purposes.

15 Does your survey reflect any data from those 13 to 16
16 years old?

17 **A.** Ages 13 to 16 are not included in the survey.

18 **Q.** And your survey does, however, capture data from those 25
19 and older; is that right?

20 **A.** Seventeen and over, yes.

21 **Q.** Thank you.

22 **A.** Including that segment, yes.

23 **Q.** And now let's talk about the timing for your survey. Your
24 survey was conducted between January 20th and February 3rd
25 2021; is that correct?

1 **A.** That is correct.

2 **Q.** And the Court earlier asked you about what time period the
3 purchases related to in the survey. You remember that?

4 **A.** That's correct.

5 **Q.** And I think you referenced that it was after the holiday
6 period.

7 What I want to ask you is what is 30 days in the past from
8 January 20th to February 3rd?

9 **A.** Well, I believe I said the bulk of it. But I could
10 certainly subtract the 20. So it would be from December 21st
11 to January 20th, I think.

12 **Q.** And would you agree me that December 21st to January 3rd
13 is the holiday period, sir?

14 **A.** It does include the holiday period for that --

15 **Q.** Thank you, sir.

16 **A.** -- that respondents and that day, that's correct.

17 **Q.** And in question 16 of your final survey, you asked
18 respondents to imagine a 5 percent increase for their in-app
19 purchases and subscriptions and to answer questions about what
20 they would do, right?

21 **A.** In part, that's correct, yes.

22 **Q.** Let's take a look at Figure 9 in your expert report. It's
23 on page 27 of the report.

24 **MS. MOYÉ:** Your Honor, that is PX2885.

25 **Q.** And I have a copy for you, if you would like.

1 **A.** Yeah, I would. Thank you.

2 **MS. MOYÉ:** Your Honor, may I approach?

3 **THE COURT:** You may.

4 (Exhibit published.)

5 **THE WITNESS:** Yes. Thank you.

6 **BY MS. MOYÉ:**

7 **Q.** Now, Dr. Rossi, I have given you a full copy of your
8 report. Some of the data on this Figure 9 has been redacted
9 because it's nonpublic.

10 You understand that, correct, sir?

11 **A.** I do.

12 **Q.** I'm not going to ask you about any of that data. I really
13 just want to refer you to the first two columns.

14 And so this Figure 9 is reporting the maximum amounts
15 different percentages of your survey respondents reported
16 spending; is that correct?

17 **A.** It's reporting the percentiles of the distribution, that's
18 correct.

19 **Q.** So is it correct that according to Figure 9, 25 percent of
20 the respondents reported spending \$5 or less on in-app
21 purchases and subscriptions from December 21st, 2020, to
22 January 3rd, 2021; is that correct?

23 **A.** That is correct.

24 **Q.** And this 25 percent were asked what they would do if the
25 prices increased by 5 percent.

1 **A.** That's correct.

2 **Q.** And a 5 percent increase on that \$5 at max would be
3 25 cents at max; is that right, sir?

4 **A.** That's correct.

5 **Q.** Okay.

6 And then 50 percent of the survey respondents reported
7 spending at most 12.99 for in-app purchases and subscriptions;
8 is that right?

9 **A.** That is correct.

10 **Q.** And for that 50 percent, your survey asks what they would
11 do if prices increased by 5 percent. That's 65 cents or less;
12 is that right, sir?

13 **A.** I'll take your word for that one, yes.

14 **Q.** And then 75 percent of the survey respondents reported
15 spending at most 29.97 for in-app purchases in the prior
16 30-day period; is that right?

17 **A.** That is correct.

18 **Q.** For that 75 percent, you asked the respondents what they
19 would do if prices increased by 5 percent or a maximum of
20 \$1.50; is that right, sir?

21 **A.** That's correct.

22 **Q.** So overall, 75 percent of your survey respondents were
23 asked how they would react if purchases that they had made
24 between December 21st, 2020, and January 3rd, 2021, had price
25 increases that ranged from less than a quarter up to \$1.50; is

1 that right, sir?

2 **A.** Not that -- it doesn't end at \$1.50. But 75 percent,
3 that's correct.

4 **Q.** For 75 percent?

5 **A.** That's correct.

6 **Q.** And then those who were able to answer the question
7 whether they would or would not make a change in response to
8 those kind of price increases, you had them go on and answer
9 another question, right? Question 17?

10 **A.** That's correct --

11 **Q.** Now --

12 **A.** -- among others.

13 **Q.** Okay.

14 And in your survey, what you concluded, before you got to
15 question 17, is that 81 percent of those who were able to say
16 whether they would make a change in response to these level of
17 price increases said they wouldn't; isn't that right?

18 **A.** That's correct.

19 **Q.** And 19 percent said they would?

20 **A.** That's correct.

21 **Q.** Okay. Then you go on to question 17, and you asked those
22 who said they would make a change, what would they do? Is
23 that correct?

24 **A.** It's correct.

25 **Q.** Let's look at question 17.

(Demonstrative published.)

BY MS. MOYÉ:

Q. And this is from your exhibit, from PX2547, page 36.

Question 17 says: What would you have done to spend less than the Apple App Store?

Then it goes on to: In considering your response, keep in mind potential cost and time required to shift purchases to other devices.

Do you see that?

A. I do.

Q. And that language "keep in mind potential costs and time required to shift purchases to other devices" appears before the entries where survey respondents can make a choice.

A. Yes. They're supposed to read it before, that's correct.

Q. And next to that language there's a point that says "see more detail."

A. That's correct.

Q. And can you read for us what's the "see more detail."

MS. MOYÉ: If we could have the next page, please.

(Demonstrative published.)

THE WITNESS: I could tell you what's there, I know my survey, if you want. But if that will save time.

BY MS. MOYÉ:

Q. It's there now.

A. I see that.

1 Q. I'd ask you to read that for us.

2 (Simultaneous colloquy.)

3 BY MS. MOYÉ:

4 Q. -- clicked on "see more detail," please read for us the
5 language they saw.

6 A. Absolutely.

7 For example, the cost of a new device and
8 accessories, installing and/or repurchasing apps
9 from a different app store, compatibility with other
10 devices, and learning how to use new features of the
11 device and the apps.

12 Q. And now, the majority of your survey respondents, that's
13 75 percent, they were asked how they would respond to price
14 increases that started at less than a quarter and were \$1.50
15 maximum; is that right?

16 A. That's correct. On an ongoing basis, that's correct.

17 Q. And you said on an ongoing basis. We looked at question
18 16. We agreed the word "permanent" was not there; is that
19 correct?

20 A. That's correct.

21 Q. And it's your testimony that the word "permanent" was
22 ambiguous?

23 A. That's correct. That's what -- and I gave testimony as to
24 the other indications of it being ongoing.

25 Q. And this language, "For example, the cost of a new device

1 and accessories, installing and/or repurchasing apps from a
2 different app store, compatibility with other devices, and
3 learning how to use new features of the device and the apps,"
4 that is not ambiguous in your opinion; is that correct?

5 **A.** It is meant to evoke --

6 (Simultaneous colloquy.)

7 **BY MS. MOYÉ:**

8 **Q.** I didn't ask you what it was meant to evoke. I asked you
9 whether that language which you actually included in your
10 survey was ambiguous in your view?

11 **A.** No, I don't believe it's ambiguous.

12 **Q.** Thank you.

13 And you asked about these type of price increases. You
14 asked people what they would do in response. Before they
15 could say what they would do in response, you reminded them of
16 the switching costs, right?

17 **A.** That is correct, as would be proper in survey practice,
18 that's right.

19 **Q.** And you gave them four options.

20 **A.** That's correct.

21 **Q.** And you concluded that 1.3 percent of those who would make
22 a change in response to price increases in the range of less
23 than a quarter to 1.50 for at least 75 percent would not
24 switch and buy a new device; is that correct, sir?

25 **A.** Correct. That's not on the basis of 17 alone, though.

1 That's correct.

2 **MS. MOYÉ:** Thank you, sir. No further questions.

3 **THE COURT:** Redirect.

4 **MS. MOSKOWITZ:** Thank you, Your Honor.

5 **REDIRECT EXAMINATION**

6 **BY MS. MOSKOWITZ:**

7 **Q.** Just a few questions, Mr. -- Professor Rossi.

8 You were asked about structured pretests and how you had
9 not done those before. Do you recall that question?

10 **A.** Yes, I do.

11 **Q.** Why did you do structured pretests here, and what did you
12 learn about structured pretests from your work here?

13 **A.** Yes. If you recall, one very unique feature of this
14 survey is that we asked people to enter their actual purchase
15 history. So this is not a recollection. It's their actual
16 purchase history.

17 And -- and what I learned from the process of doing this
18 is that it's -- in its unstructured pretest it would be
19 difficult to monitor their conscientiousness in completing
20 that task because in fact the moderator is, if you will,
21 looking over their shoulder. And there's some social onus
22 there, I guess you would call it.

23 So in the unstructured -- structured pretests, rather, we
24 are -- we mimic the actual survey conditions in which there is
25 no monitor. And we're better able to see the -- the

1 reliability and diligence of the respondents.

2 And on the basis of those structured pretests, we made
3 substantive changes to the questionnaire in order to eliminate
4 that sort of behavior. We instituted the reliability test,
5 for example.

6 **Q.** Does the Fortnite demographic have anything to do with
7 your survey?

8 **A.** No. My survey is a survey of all in-app purchases and --
9 and subscriptions, not specific to Fortnite or games.

10 **Q.** And you were asked some questions about not including
11 respondents between the ages of 13 to 16.

12 Can you tell the Court why you did not include those
13 individuals?

14 **A.** Yes. For a number of reasons. First, in designing the
15 survey, we recognized that there are joint purchases between
16 adult members or over 17 members of household and under
17 17 members, and to the extent that our data would reflect
18 those joint purchases, that would include those people.

19 Secondly, as a survey expert, I know it's very difficult
20 to acquire and I would be very skeptical of data acquired on
21 respondents of under 17. Because in order to survey someone
22 under 17, you need parental consent, and that parental consent
23 step poses a barrier to getting reliable and unbiased data.

24 **Q.** You were asked about whether you had included paid
25 downloads in the survey. Do you recall that?

1 **A.** Yes I do.

2 **Q.** And did you?

3 **A.** No, I did not.

4 **Q.** And did you -- do you have an opinion as to whether
5 excluding those paid downloads from your survey materially
6 impacted your results?

7 **A.** Yes, I do.

8 **Q.** Can you give that opinion?

9 **A.** Yes. I have been able to inspect documents that verify
10 that including paid apps would not materially affect any of my
11 conclusions vis-a-vis either revenue reduction or switching.

12 **Q.** And are those documents highly confidential Apple
13 information?

14 **A.** Yes, that's correct.

15 **Q.** So we won't go into the details there.

16 You were asked a couple of questions about I think the
17 range was 25 cents to \$1.50 for the 75 percent of your
18 respondents, that that's what the 5 percent price increase
19 would translate to. Do you recall those questions?

20 **A.** I do.

21 **Q.** When individuals were answering the questions in your
22 survey, were those the dollar amounts they were considering
23 alone?

24 **A.** No.

25 **Q.** Why not?

1 **A.** Because as I indicated, the scenario is designed to
2 simulate a longer run price change. So that price change
3 would be in effect over many months.

4 **Q.** You were asked whether your hypothetical included the
5 words "going forward into the future." Do you remember that?

6 **A.** That's correct.

7 **Q.** Did you need to use those words?

8 **A.** Yes. That was something that we actually changed on the
9 basis of the original unstructured pretest. We found
10 respondents had difficulty with that concept.

11 **Q.** And in terms of the substance of the fact that the price
12 increased would continue into the future, do you feel that
13 your hypothetical evoked that scenario?

14 **A.** Absolutely.

15 **MS. MOSKOWITZ:** No further questions, Your Honor.

16 **THE COURT:** By what words?

17 **THE WITNESS:** I'm sorry?

18 **THE COURT:** By what words?

19 **THE WITNESS:** By what words?

20 **THE COURT:** Does that -- are you communicating that
21 concept?

22 **THE WITNESS:** I'm communicating that concept by
23 stating that the prices starting 30 days ago will continue and
24 no termination date, and that the other prices at other
25 websites would remain the same without a termination date.

1 And then the idea that I'm giving you the price increase so
2 that would be something that, as a consumer, I would not be
3 able to infer without a long period of time.

4 Does that make sense what I'm --

5 **THE COURT:** I think it's ambiguous.

6 So where can I find your data that shows me your thinking
7 process for your taking out words initially and getting to
8 this particular formation of your question?

9 **THE WITNESS:** Yes. It's absolutely described at
10 length in the appendices to my report where you go through all
11 the versions and the reasons for each one and the source of
12 the information that informed each of the decisions.

13 **THE COURT:** And is that evidence in the record?

14 **MS. MOSKOWITZ:** Your Honor, it was not attached to
15 the written direct, but we can offer it and include it in the
16 materials.

17 **THE COURT:** I would like that. Thank you.

18 **MS. MOSKOWITZ:** Will do. Thank you, Your Honor.

19 **THE COURT:** Any follow-up?

20 **MS. MOYÉ:** Just -- just one quick thing.

21 **RECROSS-EXAMINATION**

22 **BY MS. MOYÉ:**

23 **Q.** You just explained that one of the things survey
24 respondents did was go and look at the purchase history on
25 their iPhones in order to complete the survey; is that right,

1 sir?

2 **A.** That's what we asked them to do, yes.

3 **Q.** And so would you say that that was useful in terms of your
4 survey for iPhone customers to have the ability to look at
5 their purchase history?

6 **A.** I couldn't comment on that. It's useful for us with our
7 survey. That's the only --

8 (Simultaneous colloquy.)

9 **BY MS. MOYÉ:**

10 **Q.** That's what I said. Was it useful for your survey?

11 **A.** For me from the survey, yes.

12 **Q.** Thank you, sir.

13 **MS. MOYÉ:** That's it.

14 **THE COURT:** And you also then didn't ask them during
15 the survey, I take it, one way or the other that the App Store
16 price on downloads did or did not change.

17 **THE WITNESS:** No. We -- we didn't consider downloads
18 so that would not be changing.

19 **THE COURT:** And did you advise them of that in any
20 way, shape, or form during the survey in this imaginary
21 scenario that you were asking them to envision?

22 **THE WITNESS:** Not -- not explicitly. We advised them
23 that the prices of the in-app purchases and subscriptions
24 would be increasing but --

25 **THE COURT:** And didn't do also any --

(Simultaneous colloquy.)

THE WITNESS: -- address the download.

THE COURT: You also didn't do any comparison in terms of their spending habits with respect to downloads versus subscriptions or IAP's.

THE WITNESS: Their spending habits? No. I just looked at these documents that allowed me to assess the magnitude of that spending.

THE COURT: And you also, I take it, didn't do any inquiry into the nature of the IAP's for which they had subscriptions?

THE WITNESS: No. We considered the IAP's and subscriptions as the class, all products simultaneously.

THE COURT: All right.

Anything on those questions, Ms. Moskowitz?

MS. MOSKOWITZ: No, Your Honor.

MS. MOYÉ: No, Your Honor.

THE COURT: All right. You're excused, sir. Thank you.

MS. MOSKOWITZ: Your Honor, as the witness is the stepping down, I just wanted to mention that in your binder you do have Professor Rossi's report which is PX2885 and Appendix F, G, and H do contain the information that Professor Rossi was referring to.

But we will -- and we will move those into evidence.

1 **THE COURT:** Okay. Thank you.

2 Next witness.

3 **MR. CLARKE:** Your Honor, Justin Clarke on behalf of
4 Epic Games.

5 Epic would like to call Professor James Mickens.

6 And we do have a binder containing some demonstratives and
7 a copy of his written testimony.

8 **THE COURT:** All right. Thank you.

9 **THE CLERK:** Could you stand up so I can swear you in,
10 please. Thank you.

11
12 **JAMES MICKENS,**

13 called as a witness for the plaintiff, having been duly sworn,
14 testified as follows:

15 **THE WITNESS:** I do.

16 **THE CLERK:** All right. You can be seated.

17 And then just be sure that mic is underneath instead of in
18 front of the user shield. And then please state your full
19 name and spell your last name.

20 **MR. CLARKE:** Professor Mickens, could you state your
21 full name and spell your last name for the Court.

22 **THE WITNESS:** Yes. My full name is James Williamson
23 Mickens, and my last name is spelled M-I-C-K-E-N-S.

24 **THE COURT:** Good afternoon, sir.

25 **THE CLERK:** Okay. And then where's the mic? Okay.

1 **THE WITNESS:** Can you hear me now?

2 **THE COURT:** That's better. We want it to come up in
3 under the mic.

4 So good afternoon.

5 **THE WITNESS:** Good afternoon.

6 **THE COURT:** You may proceed.

7 **MR. CLARKE:** Thank you, Your Honor.

8 **DIRECT EXAMINATION**

9 **BY MR. CLARKE:**

10 **Q.** Professor Mickens, what is your occupation?

11 **A.** My current occupation is a professor of computer science
12 at Harvard University.

13 **Q.** And Professor Mickens, which subjects do you teach at
14 Harvard?

15 **A.** I teach an undergraduate level course on operating
16 systems, and then I teach a graduate level course on computer
17 security.

18 **Q.** Could you provide the Court with a brief summary of your
19 educational background, Professor Mickens?

20 **A.** Sure. I got my undergraduate degree from Georgia Tech
21 where I got a bachelor's degree in computer science. And then
22 I went to get a Ph.D. in computer science at the University of
23 Michigan.

24 **Q.** And Professor Mickens, what did you do before teaching at
25 Harvard?

1 **A.** Before I got to Harvard, I was a researcher at Microsoft
2 Research in Redmond, Washington. I worked in the distributed
3 systems group. And then during that time period, I also had a
4 stint as a visiting Professor at MIT in the parallel and
5 distributed operating systems group.

6 **Q.** Professor Mickens, have you ever been an expert witness in
7 litigation before?

8 **A.** I have not.

9 **Q.** What experience do you have in the area of mobile device
10 security?

11 **A.** I have performed a variety of research projects in that
12 area, for example, looking at secure ways to expose mobile
13 sensors like cameras and accelerometers to applications.

14 I have also supervised a variety of student research
15 projects on that topic. And I reviewed a variety of papers on
16 iOS security for the top conferences in my field.

17 **MR. CLARKE:** Your Honor, I understand that this might
18 not be necessary, but I'd like to offer Professor Mickens as
19 an expert.

20 **THE COURT:** He's admitted.

21 I'm now beginning to, given some of the questioning,
22 understand why antitrust lawyers offer them so that when they
23 sit on the stand again they can say, "Have you ever been
24 admitted?" And then they can say affirmatively yes.

25 Typically, when trial lawyers don't offer them, it's

1 because they don't want the jury to -- they don't want the
2 jury to have my imprimatur on it, and so they don't ask.
3 That's why I say it's not necessary.

4 But I now understand why antitrust lawyers do it.
5 Proceed.

6 **MR. CLARKE:** Thank you, Your Honor.

7 **Q.** Professor Mickens, when were you employed at Microsoft?

8 **A.** I was employed starting in 2008 and I stopped working
9 there in 2015.

10 **Q.** And did you have oversight responsibility for anybody
11 during your time at Microsoft?

12 **A.** The only people who reported to me directly were summer
13 research interns. These were graduate students who came to
14 Microsoft to perform research under my direction.

15 **Q.** Have you had any affiliation with Microsoft since the time
16 you left the company in 2015?

17 **A.** I have been invited to serve as a panelist in several
18 iterations of a mentoring conference that Microsoft holds for
19 Ph.D. students who have received a Microsoft Ph.D. fellowship.

20 I was also, in 2018, invited to something known as a
21 research faculty summit. Basically Microsoft invites a
22 variety of professors from different institutions to come to
23 Microsoft to talk about their own research and share some of
24 the research that Microsoft is doing.

25 **Q.** Do you have any ongoing relationships with anyone from

1 Microsoft today?

2 **A.** None other than a research collaboration that I currently
3 have with a researcher in Microsoft's New York lab.

4 **Q.** Does that research collaboration relate to mobile device
5 security?

6 **A.** It does not.

7 **Q.** Professor Mickens, could you please explain your
8 assignment in this case.

9 **A.** Certainly. I was asked to evaluate the security of
10 iPhones as it relates to the App Store and more generally as
11 the security of the platform relates to various channels of
12 distribution for applications that are on -- on an iPhone.

13 **Q.** And did you submit an opening written direct testimony in
14 this case?

15 **A.** I did.

16 **Q.** Who wrote that testimony?

17 **A.** I wrote that testimony solely myself.

18 **Q.** Is -- does that appear at tab 1 of the binder that you
19 have in front of you, labeled Exhibit Expert 5?

20 **A.** Yes, I believe that it does.

21 **Q.** Does that appear to be a true and correct copy of the
22 testimony that you wrote?

23 **A.** It does appear to be so, yes.

24 **MR. CLARKE:** Okay. Your Honor, subject to the same
25 understanding with the other written testimony, we would offer

1 that for admission.

2 **THE COURT:** And it is provisionally admitted as with
3 the others.

4 **MR. CLARKE:** Thank you.

5 **Q.** Professor Mickens, what materials did you rely on to
6 formulate your opinions in this case?

7 **A.** I relied on several different sources. I first of all
8 relied on academic articles about computer security that were
9 submitted to conferences considered reputable in my field.

10 I also relied on public facing documentation that Apple
11 provides about its products.

12 I relied on the work of reverse engineers who have
13 analyzed how Apple's products work. In particular, I looked
14 at a book written by Jonathan Levin, considered one of the
15 experts in reverse engineering, to understand his analyses.

16 I also looked at articles in the popular press which
17 talked about various aspects of computer security.

18 And finally, I relied on my own expertise and research and
19 training in the fields of operating systems and security.

20 **Q.** Professor Mickens, are the sources that you listed the
21 types of sources that you typically rely on in your academic
22 work?

23 **A.** They are. Both myself and other academics in the field of
24 computer security and operating systems oftentimes cite or
25 rely on evidence from the various sources that I just

1 described.

2 **Q.** And Professor Mickens, could you give a high-level summary
3 of the conclusions that you reached in connection with your
4 assignment in this case?

5 **A.** Yes.

6 So a high-level summary of my conclusions is shown in this
7 demonstrative.

8 (Demonstrative published.)

9 **THE WITNESS:** And the conclusions are four in number.

10 So first of all, I found that if you look at the security
11 properties that an iPhone provides to its users, then those
12 security properties are mainly enforced by the operating
13 system, which in this case is iOS.

14 And so what this means, as listed in my sort of second
15 summary of conclusion bullet, is that when we look at the
16 benefit that the app review provides, well, that app review
17 actually provides minimal additional security benefits
18 compared to the security benefits that an OS alone could
19 provide.

20 And so what that means sort of in layperson's terms is
21 that the -- the safety of your experience on an iPhone is
22 largely guaranteed by iOS, not by the app review process.

23 Now, the third conclusion that I came to is that if you
24 look at iOS as it's currently designed today, iOS is already
25 capable of installing applications that didn't come from the

1 centrally managed Apple App Store. And this is true both of
2 iOS and of Mac OS, another Apple-designed operating system.

3 And my fourth high-level conclusion is that if iPhones
4 were indeed opened up to third-party distribution channels, in
5 other words, if third-party app stores were allowed on the
6 iPhone, then that would not result in users of the iPhone
7 suffering from a meaningfully less secure experience on those
8 devices.

9 **Q.** Professor Mickens, could you explain at a high level what
10 you mean when you use the term "security"?

11 **A.** Yes. If we go to the next demonstrative.

12 (Demonstrative published.)

13 **THE WITNESS:** Then what we see here is a -- a sort of
14 30-thousand-foot view of the various security mechanisms that
15 an iPhone uses to protect users.

16 At a high level, we can break these individual mechanisms
17 into three categories. At the bottom, we see security
18 mechanisms that are enforced via on-device hardware. Now by
19 hardware, I just mean components that are physical in nature
20 like the touch screen, like the CPU, like memory, so on and so
21 forth.

22 And so at the very bottom we see hardware-based security
23 mechanisms, for example, involving biometric authentication,
24 how does the phone deal with fingerprint scan data, for
25 example.

1 Now if we look at that middle row, that middle row is
2 labeled on device security mechanisms that are enforced by the
3 operating system. And just to be clear, when I say on device,
4 I mean the actual device that the user uses, like the actual
5 iPhone, for example.

6 Now in my opinion, it's that middle layer of security
7 mechanisms, the ones enforced by the on-device operating
8 system that are the most important. And the reason is that
9 the operating system is responsible for configuring or
10 managing many of these security properties provided by the
11 hardware level. And furthermore, there are security
12 properties that the operating (sic) itself is really uniquely
13 situated to provide.

14 So that middle layer, in my opinion, is the most important
15 layer with respect to security.

16 **THE COURT:** Is it all -- do you have an opinion as to
17 why the Android has more security issues than the iPhone?

18 **THE WITNESS:** So this may come up throughout the
19 direct and the cross. My opinion is that if you look at
20 various commodity operating systems, so for example, like iOS
21 or Android, I believe that they are in the same rough
22 equivalence class when it comes to susceptibility to malware,
23 viruses, or things like that.

24 **THE COURT:** So you don't think there's a difference
25 between the two devices in terms of security?

1 **THE WITNESS:** I don't think there is a meaningful
2 difference. Now that's a bit subtle. What do I mean by
3 meaningful? Why am I qualifying it like that? Because I
4 think that at the margins, for example, we could identify
5 certain specific types of malware that might only affect iOS
6 versus, let's say, Android. But if we look sort of
7 holistically at the big picture of security, then I think that
8 these two platforms are roughly equivalent in terms of their
9 security properties.

10 **THE COURT:** Okay. You may proceed.

11 **MR. CLARKE:** Thank you.

12 **THE WITNESS:** Thank you.

13 **BY MR. CLARKE:**

14 **Q.** So, Professor Mickens, I think that you explained to us
15 the two bottom layers of the demonstrative that we're looking
16 at here. What is the top layer showing?

17 **A.** Yes, sir. Well, what the top level shows, this is sort of
18 the third tier of security enforcement on an iPhone. And I
19 call this tier off-device security that is related to app
20 distribution. In other way -- in other words, the mechanisms
21 by which an application is reviewed, if at all, and the
22 mechanisms by which developers are -- are registered, if at
23 all, with some central authority, and the extent to which
24 applications are signed.

25 We'll probably go into this in more detail during the rest

1 of my testimony. But what does signatures, what does that
2 mean? Well, a signature connotes attribution and integrity.
3 It basically tells you where a particular piece of digital
4 content, where it came from. That's the attribution part.

5 And then it also tells you has that content been tampered
6 with, been tampered with by some external party in a way that
7 the original signing authority would not have liked.

8 So those are the three layers of security on an iPhone.

9 **Q.** So, Professor Mickens, you testified that you believe that
10 the operating system is the most important security layer.
11 Could you just give us a very high-level summary of how an
12 operating system works.

13 **A.** Sure. So if we go to the next demonstrative.

14 (Demonstrative published.)

15 **THE WITNESS:** Then here we see what I think is a
16 helpful analogy for understanding how an operating system
17 works. So first before we think about operating systems,
18 let's first think about going to a restaurant. Okay.
19 Something we were all fond of doing back in the pretimes.

20 So if you go to a restaurant, let's say that you're a
21 customer and you want to get something to eat. So in most
22 restaurants, you as the customer can't just go to the kitchen
23 and start preparing the meal yourself. Instead, there's a
24 chef who is the executive, if you will. It's the chef who
25 ultimately controls how the -- how the ovens work, how the

1 ingredients are combined, which ingredients are used, so on
2 and so forth. And so the chef is the executive of the
3 kitchen.

4 Now in most restaurants, though, you as a customer can't
5 just directly ask the chef to do things. Instead, there's a
6 wait staff, people who sit in between you as the customer and
7 the chef.

8 And so you have these levels of intermediation. So even
9 though the chef is the ultimate controller of what happens in
10 the kitchen, by having that wait staff layer, we essentially
11 allow the chef to focus on the lowest level task of running
12 the kitchen. Whereas we can defer the work of customer
13 service and showing people menus, that can all be deferred to
14 the wait staff.

15 So that's the way a restaurant works. Ultimately
16 customers want to interact with the kitchen, but to do so,
17 they have to go through several intermediate layers.

18 Now if we look on the right-hand side of that
19 demonstrative, what we see is the organizational structure for
20 a computing device. So for example, like a desktop, a laptop,
21 or in fact like an iPhone. So what we see is that at the
22 lowest level, we have the hardware that's associated with that
23 device, the physical components. Once again like the CPU,
24 like the touch screen, so on and so forth.

25 So apps are all the way up at the top. Apps are the

1 things that users interact with, the things that they
2 download, they install, that they see on their home screen.

3 Now ultimately those apps want to interact with the
4 hardware to do things like send network data, read or write
5 from a storage device, interact with other apps.

6 However, much like in a restaurant, how a customer can't
7 directly do things in the kitchen, on a computing device the
8 apps can't directly manipulate the hardware. That's what the
9 operating system is responsible for.

10 And so the operating system, that's what we see in those
11 two middle layers. And so at the lowest layer of the
12 operating system, we see the kernel. That's analogous to the
13 chef in a restaurant. That's the ultimate determinant of what
14 happens on the machine, what happens on the hardware.

15 But then above the kernel, we have this thing called
16 middleware. And by way of analogy, you can think of
17 middleware as being analogous to the wait staff.

18 So oftentimes when an application wants to do something on
19 the -- on the phone, he doesn't just talk to the kernel
20 directly. Instead it sends a request to the middleware. The
21 middleware might do some initial processing of that request,
22 send it to the kernel. The kernel then decides whether or not
23 to fulfill that request and, if so, how.

24 **BY MR. CLARKE:**

25 **Q.** Professor Mickens, the Court has heard some testimony this

1 week from economists who discuss the term "middleware" as a
2 particular type of cross platform software. Is that what
3 you're referring to when you talk about middleware in your
4 testimony?

5 **A.** Not quite. So the word "middleware" is used in a variety
6 of contexts in computer science and can be -- be a bit
7 confusing to understand which one is being used, which
8 context.

9 So here I specifically mean software that has been written
10 by the OS vendor to assist with the operation of the operating
11 system's kernel.

12 **Q.** And Professor Mickens, why is it that you believe the
13 operating system is the most important security layer?

14 **A.** The reason why I believe that it's the most important
15 security layer is because when we think about what makes an
16 application malicious or benevolent, well, those distinctions
17 are client side distinctions.

18 Now, that word may come up a couple of times throughout my
19 testimony and the cross. What I mean by client side is simply
20 the device that the user uses. And I use the word "client
21 side" to distinguish from the server side.

22 So, for example, there's a computer run by Apple or
23 someone else maybe somewhere in the cloud doing analyses over
24 there. That's what server side means versus client side which
25 is just the -- what's happening on the user device.

1 So when we look at the notion of what makes an app
2 malicious, what makes a program malware, for example, that's a
3 behavioral definition. We're saying that malware is bad
4 because it tries to do bad things. And so those attempts at
5 doing bad things are all happening on the client side device,
6 on the iPhone itself in this example.

7 So when we think about how do we protect a user, a human
8 user, from malicious applications, that boils down to how do
9 we prevent malicious behavior on that user device. And it's
10 the operating system that is uniquely situated to see the
11 types of bad behavior that apps may try to perform.

12 And so that's why I think that the operating system is the
13 most important layer of security.

14 **Q.** Professor Mickens, could you just provide us a very high
15 level summary for how an operating system enforces security on
16 a device?

17 **A.** I'd be glad to.

18 So let's now look at the new demonstrative that we see
19 here.

20 (Demonstrative published.)

21 **THE WITNESS:** So what I'm going to do is step you
22 through some of these ovals. And I'll provide a high-level
23 overview. I'd be glad to provide more technical details if
24 that's so desired.

25 But a high level, when we're looking at the security

1 mechanisms that an operating system provides, the first
2 category of protections involve memory protection for the
3 kernel.

4 Okay. So that's a lot of jargon. What does that mean?
5 Well, let's think about another metaphor, another analogy.

6 So imagine that you're thinking about a program and you
7 can imagine that program, it's a person. It's a person who
8 wants to achieve some task.

9 Now that person is in an office. That office might have a
10 big bookshelf full of books and records and so on and so
11 forth. But when that person wants to work on a particular
12 task, they have to bring a subset of the total things they --
13 they have in the bookshelf onto a desk. And that's where we
14 have the set of things a person has worked on right now. So
15 we have a person, a bookshelf, and a desk.

16 By way of analogy, when we look at applications, when we
17 look at iPhones, for example, you can think of the bookshelf
18 as being analogous to a storage device. So it's very large
19 and contains a very -- a wide array of things that
20 applications might possibly want to work on.

21 However, when an application wants to work on a specific
22 set of things, it has to bring information from that bookshelf
23 into the desk. And so if we look at what happens on a real
24 device, the bookshelf is a storage device and the desk is
25 memory.

1 So what I'm referring to right here when I say memory
2 protection for the kernel, I'm saying there are a certain set
3 of security techniques that prevent applications that may be
4 malicious, that may have programming bugs in them, that are
5 misbehaving for whatever reason, these memory protection
6 mechanisms I'm showing you here prevent those applications
7 from tampering with or stealing information in the memory that
8 belongs to the kernel.

9 So that's what that layer is doing right there.

10 **Q.** Professor Mickens, could you describe the other layers
11 that the operating system enforces?

12 **A.** Yeah. So if we go to the next demonstrative.

13 (Demonstrative published.)

14 **THE WITNESS:** So what do we see here?

15 So here we see a series of security mechanisms that are
16 designed to provide memory protection not only for the
17 operating system, but also for the apps as well, the -- the
18 programs that users install and launch and that they see on
19 the home screen.

20 And so at a high level, the goal of these security
21 mechanisms is the same as the ones that we just looked at. We
22 want to make sure that malicious or buggy or otherwise
23 misbehaving applications can't read or write the memory state,
24 the memory information that belongs to other applications or
25 to the operating system itself.

1 **BY MR. CLARKE:**

2 **Q.** And what else? What other security layers does the
3 operating system provide?

4 **A.** So if we go to the next demonstrative.

5 (Demonstrative published.)

6 **THE WITNESS:** Then what we see here is we see this
7 sandboxing layer. So the sandboxing layer, in my opinion, is
8 one of the most important types of security mechanisms that an
9 operating system provides.

10 So we see in that blue callout to the right, that callout
11 is saying that sandboxing isolates misbehaving processes.
12 That just means misbehaving applications.

13 And so what does it mean to misbehave? Well, as I
14 mentioned earlier, when we think about what the distinction is
15 between malware and non-malware, between, quote, unquote, good
16 apps and bad apps, those are behavioral distinctions. Is that
17 app trying to do something bad on a real user's client side
18 device?

19 And so what sandboxing does is it essentially interposes
20 on it, it examines the type of behaviors that an application
21 is trying to perform.

22 Now, in a device like an iPhone, and really in any
23 commodity operating system, the only way that an application
24 can interact with the outside world, whether that be the
25 operating system, hardware on that local machine, other apps,

1 the only way that can happen is if an app asks the operating
2 system to perform a behavior on behalf of that app.

3 Now, the technical term for the mechanism by which apps
4 make that request is called a system call. I mentioned this
5 in my expert witness report. But you can just think of that
6 system call, it's just a request. So if an app wants to write
7 to a storage device, it just sends a request to the operating
8 system.

9 **THE COURT:** But can't that -- by having the app on
10 the iPhone or any commodity device, isn't that in fact the
11 risk of someone inadvertently having something like that on
12 their device and then all of a sudden the -- the whole system
13 is compromised? I mean that's -- that's why you don't open up
14 emails where you don't know, you know, who they come from
15 and -- and other things like that. Isn't that the -- isn't
16 that the concern?

17 **THE WITNESS:** Well, sandboxing helps to address some
18 of those concerns. So what you are talking about, and correct
19 me if I'm wrong, is basically what is the -- what is the
20 damage that can be done if somehow something bad gets on a
21 client device and then that -- that application runs somehow.

22 Well, sandboxing is one of the critical security
23 mechanisms that operating systems use to restrict the scope of
24 damage, if you will.

25 So even if somehow a malicious app gets on a client

1 device, sandboxing says, well, you can't do everything. So
2 for example, you as the app, you can't write to arbitrary
3 places in the storage device.

4 So sandboxing precisely tries to provide protections
5 against some of the things that you were mentioning.

6 **THE COURT:** So if apps get onto the device through a
7 system over which, in this case, Apple has no control, the
8 sandboxing can still take care of it; is that what you're
9 saying?

10 **THE WITNESS:** Yes. And this is an extremely
11 important point.

12 So if you look at how sandboxing works, sandboxing, and in
13 fact, all of these security mechanisms, are agnostic as to the
14 means by which an application gets on a device like a phone,
15 for example.

16 So even if there is, let's say, a third party app store
17 that delivers a malicious app, or in fact if there was a
18 malicious app that comes through a first-party app store --
19 that does happen -- the OS can still sandbox that app and
20 restrict the kind of damage that it can perform.

21 **THE COURT:** Okay. Proceed.

22 **THE WITNESS:** Okay. Thank you.

23 So, yes, so that is the purpose of the sandbox layer. It
24 is to restrict the types of interaction that an application
25 can have with the rest of the system.

1 **BY MR. CLARKE:**

2 **Q.** And Professor Mickens, there's one final layer here that
3 you didn't mention. Could you just describe what that does?

4 **A.** Yes. So if we go to the next demonstrative.

5 (Demonstrative published.)

6 **THE WITNESS:** Then what we see here is the layer of
7 the operating system that performs digital signature
8 validation.

9 Now I briefly mentioned signatures before. Just as a
10 reminder, a signature is basically a note that you can attach
11 to a piece of digital content that provides attribution and
12 integrity. So where did that piece of digital content come
13 from? Did it come from an individual developer? Did it come
14 from a company? So on and so forth. And also integrity. Has
15 that digital content been tampered with after it was generated
16 by the person that we've attributed it to?

17 And so this layer in the operating system can basically
18 look for signatures that are attached to digital content
19 that's arrived on the machine and then, based on some type of
20 security policy, determine whether some particular action
21 should be -- should take place. So, for example, whether a
22 signed application should be allowed to be installed or not.

23 **BY MR. CLARKE:**

24 **Q.** And so, Professor Mickens, going back to the Court's
25 question a moment ago, are any of the layers that you've just

1 identified as on-device security layers that are implemented
2 by the operating system, are any of those layers dependent on
3 the means by which an app arrives on the device?

4 **A.** They are not. And if we go to the next demonstrative,
5 yes, this in fact is what this demonstrative shows.

6 (Demonstrative published.)

7 **THE WITNESS:** Why are these security mechanisms
8 independent of the means of app distribution? Well, at a high
9 level, it all gets back to how do we define something being
10 good or bad. It's not about the way in which that application
11 arrived on the phone. It's all about what does that
12 application try to do once it gets there?

13 And so all of these mechanisms that we're looking at here
14 are looking at behavioral aspects, restricting or observing
15 somehow what applications try to do. And that can be done
16 regardless of the distribution channel by which an app arrived
17 on the phone.

18 **BY MR. CLARKE:**

19 **Q.** Professor Mickens, were you asked to evaluate the security
20 aspects of the App Store distribution channel?

21 **A.** Yes, I was.

22 **Q.** And could you just explain to the Court how a developer
23 goes about distributing an app through the App Store?

24 **A.** Yes. So one important thing to keep in mind about this
25 model is that if you're a developer and you want to create an

1 app and distribute it to users on an iPhone, you can't just do
2 that yourself independently. You can't directly distribute it
3 to end users.

4 Instead what you have to do is go through an Apple-run
5 process. So at a high level, the way this works is that
6 imagine we have a developer. Let's --

7 **THE COURT:** Have you ever created an app.

8 **THE WITNESS:** Excuse me.

9 **THE COURT:** Have you ever created an app yourself?

10 **THE WITNESS:** I have, but not none that have been
11 distributed publicly.

12 **THE COURT:** Okay. Have you ever gone yourself
13 through the process with Apple?

14 **THE WITNESS:** I myself have not, no.

15 **THE COURT:** Okay. Just curious. Keep going.

16 **THE WITNESS:** Yeah, no worries.

17 Let's see. So, yeah. So let's imagine that we have a
18 developer for -- who wants to create iOS apps. Let's imagine
19 that her name is Alice. So before Alice can do anything, she
20 must first register with Apple's developer program.

21 This essentially makes Alice a known entity to Apple. And
22 Apple gives to Alice at a high level a set of cryptographic
23 information. The details we don't need to get into unless
24 people are curious. But suffice it to say that after Alice
25 registers with Apple, she can now sign applications such that

1 Apple can tell that a particular application came from her as
2 opposed to some other person.

3 Okay. Great. So now Alice is registered with the -- with
4 the developer program. Alice now starts to construct her app.
5 So she writes the code, she creates the data, maybe she's
6 bringing in images and stuff like that. She -- she develops
7 the app. And finally Alice determines, okay, my app is -- is
8 good, it's ready to -- to be used by users.

9 Now, once again, app -- Alice cannot just directly put the
10 app up on her website and allow people to install it. Instead
11 Alice has to submit that app to the centrally managed review
12 process that Apple manages.

13 And so what happens at this point is that Alice uploads
14 her app. It's signed by Alice. This allows Apple to
15 determine the providence, the attribution of the app. And
16 also allows Apple to tell that the app hasn't been tampered
17 with.

18 So now the review process looks at Alice's app and tries
19 to determine whether in Apple's opinion this app is acceptable
20 for distribution on iPhones.

21 The characteristics that Apple looks for are enumerated in
22 the public facing app review guidelines. Some of those
23 properties involve security, but many of them do not.

24 So Apple reviews the app. And if the review is
25 successful, in other words, if Apple deems this app worthy to

1 be distributed through the App Store, Apple then takes the app
2 and now signs it itself. In other words, Apple now signs the
3 app and then publishes this on the public facing app store.

4 So let's imagine now that another user, Bob, comes along.
5 And Bob wants to install Alice's app. Bob has to go to the
6 Apple-run App Store, find the app listed there, and then he
7 downloads that onto his own iPhone.

8 Now what the iOS on his iPhone is going to do is it's
9 going to check to see if this app has been signed by Apple.
10 If it hasn't, then Bob's iPhone is not going to allow that app
11 to be installed. Otherwise the app is allowed to be
12 installed.

13 So you can think of that signature from Apple on the app
14 as acting like Apple's stamp of approval basically that the
15 iOS will check for at installation time.

16 **BY MR. CLARKE:**

17 **Q.** Professor Mickens, could you explain the types of security
18 properties that the app review process screens for?

19 **A.** Yes.

20 So what we're seeing on this demonstrative here --

21 (Demonstrative published.)

22 **THE WITNESS:** -- this is a high-level taxonomy of the
23 types of security properties that the review process purports
24 to scan for, like if you were to look at the public facing
25 guidelines.

1 So there are five different classes of security properties
2 that the review process tries to screen for. So let me
3 explain each one of these in turn.

4 First we have sandbox compliance. Now, remember that a
5 sandbox is basically a way of restricting the types of
6 behaviors that an application can perform. And so sandbox
7 compliance just means that the app review is trying to
8 determine whether a particular app has been behaviorally
9 restricted in appropriate ways.

10 If you look at that second property, exploit resistance,
11 that's basically talking about the following fact: Even if
12 you as a developer are well intentioned, in other words, even
13 if you're not trying to write malware, your program may still
14 have some logic errors or things like this that might allow an
15 outside party to subvert the operation of your application.

16 And so exploit resistance is basically trying to check
17 whether the application has been structured in a way that
18 makes it less likely to be subverted by an attacker.

19 All right. So now let's look at this third property,
20 malware exclusion. Now this is different. So in the second
21 category, I was saying assume that a developer is benevolent
22 but may have written bugs in the application that allow the
23 application to be subverted.

24 What we're looking at with malware exclusion is that now
25 we're trying to say, well, some apps may be intentionally

1 malicious. And so malware exclusion tries to prevent those
2 applications from running on the user device in the first
3 place.

4 So now let's look at these two final properties.

5 So first, user consent for private data. At a high level,
6 what this means is that if an application tries to access
7 private data, like camera data, like your GPS data, so on and
8 so forth, then the application should have to prompt the user
9 for consent before the app can actually access that data.

10 Now I should say that there are two types of private data.
11 One type is computer-generated private data. This is data
12 that comes from a hardware sensor, for example, like a GPS
13 unit, like a camera. Or it's data that comes from a database
14 that is managed by the operating system. So an example of
15 this is like your contact list. So all of that type of
16 private data I categorize as being computer-generated private
17 data.

18 There's a second class of private data that I call
19 human-generated private data. And that's private data that,
20 for example, you might enter into the text field of an app.
21 You enter in your birthday, your Social Security number, your
22 credit card, things like that. So the ultimate source of that
23 data and the management of it rely -- resides with you, the
24 user.

25 So that's what user consent for private data is about. If

1 an app tries to access those types of data, is the user
2 prompted so that the user can provide explicit consent before
3 that data is released.

4 And then finally we have this property called legal
5 compliance. So this property is easy to state, but it's
6 difficult to enforce. It basically means if you have an app
7 that's being used by a user in a particular legal
8 jurisdiction, well, does that app satisfy all of the laws of
9 that particular jurisdiction?

10 **BY MR. CLARKE:**

11 **Q.** And Professor Mickens, have you undertaken any comparison
12 between these security features that you've just listed as
13 being enforced by the app review process and those that are
14 enforced by the operating system?

15 **A.** I have. And in fact, if we look at this demonstrative up
16 here --

17 (Demonstrative published.)

18 **THE WITNESS:** -- I categorize which of these security
19 properties can be enforced by an OS alone.

20 So what we see at a high level, what this chart is saying
21 is that we have in each row the security properties that I
22 just talked about.

23 And then the two columns that we see off to in the middle
24 and in the right talk about can an operating system enforce
25 this security property? And can an app review enforce this

1 security property?

2 And so what we see is that for the first three security
3 properties, sandbox compliance, exploit resistance, and
4 malware exclusion, an operating system is perfectly capable of
5 enforcing these security properties without any additional
6 assistance from an app review.

7 Now if we look at those bottom two categories, at a high
8 level what we're seeing here is that both an app review and an
9 operating system have a difficult time enforcing these
10 properties.

11 And so the high-level takeaway point from this is that we
12 see that there are three properties an OS can provide by
13 itself. There are two properties that both the OS and the app
14 review struggle with. And this informs my expert opinion that
15 when you look at the primary guarantors of security for the
16 user experience on an iPhone, the app review provides minimal
17 additional security properties beyond those which the
18 operating system already provides.

19 Now, if we look at this table, we can go row by row and I
20 can explain my reasoning behind this. So for example, if we
21 look at sandbox compliance, remember what that's about is it's
22 saying can we ensure that an application's behavior is
23 restricted? And remember that the way that an application
24 interacts with the rest of the system is via system calls, via
25 requests that are sent to an operating system.

1 Well, these are all client-side behavioral properties, the
2 types of requests, the types of system calls that an app is
3 generating. So an operating system which is actually on the
4 client device is perfectly situated to enforce this particular
5 security property.

6 If we look at that second row, exploit resistance, so
7 that's all about trying to make benevolent but possibly buggy
8 applications be robust against attempted attacks by outside
9 parties.

10 Well, when we talked about, a few demonstratives ago, all
11 of those memory protection techniques, those are all exploit
12 resistance techniques. Those are all techniques that make an
13 application more difficult to -- to attack, to subvert. It
14 makes it more difficult for malicious parties to steal data
15 from apps or to overwrite that data.

16 And so an operating system is also well equipped to
17 enforce these properties as well.

18 All right. So let's look at this third property here, so
19 malware exclusion. So this is the idea that we want to
20 prevent malicious code from executing on -- on a client
21 device.

22 Well, you can provide that property within the operating
23 system either by having first party malware scanners or by
24 having third party malware scanners. Why can we do this?
25 Well, once again malware, we define the goodness or badness of

1 an application with respect to the behaviors that it tries to
2 perform. And so because the operating system is the manager
3 of a device and because it sees all the attempted behaviors,
4 it can act as a platform for excluding malware.

5 Okay. So now let's look at those bottom two categories.
6 These are the categories where I think that it's difficult for
7 both an OS and an app review to provide the security
8 properties.

9 So let's first look at user consent for private data.
10 Well, as I mentioned, there are two different types of private
11 data. The first is computer-generated or computer-managed
12 private data, things like your contact list or things like a
13 sensor data from your -- from your phone or from your
14 accelerometer.

15 Well, the way that applications would attempt to read or
16 write that data is via system calls, via requests that are
17 sent to the operating system.

18 So the operating system is the thing that sees those
19 requests. And so thus the operating system is uniquely
20 well -- well situated to enforce user consent for that type of
21 private data. Because when the OS sees a request from an app
22 to access, let's say, your GPS unit, the OS itself can put up
23 a prompt and say, "User, do you authorize this particular
24 request?"

25 So an OS is perfectly well situated to perform that type

1 of security check.

2 Now I did mention a second type of private data. This is
3 human-entered, human-generated data. So, for example,
4 something like a birth date that you type into a text form.

5 Well, here it's difficult for an OS to detect such data
6 and track how it's manipulated, in part because there are so
7 many different ways that a user can enter that data into a
8 device. For example, a birth date can be construed as like
9 day/month/year or month/day/year. How many digits do we have
10 for the year? Is it four? Is it two? So it's -- it's a hard
11 problem for software, and OS included, to automatically
12 determine what human-generated data of a private nature looks
13 like.

14 So an OS struggles to track that data. But so does the
15 app review. It's actually hard for a human user to
16 discover -- sorry, by "human user," I mean a human app
17 reviewer. It's hard for a human app reviewer to test all the
18 various parts of an application, see all the various places
19 where private data might be requested.

20 It's also hard for either a human reviewer or an automated
21 technique like static or dynamic analysis, it's hard for all
22 of these approaches to figure out how that data might be
23 computed on and how it might be shared with external third
24 parties.

25 So both the app review and the operating system struggle

1 here.

2 And that's also the same for legal compliance. Both the
3 app review and the operating system have a tough time
4 determining whether an app satisfies the requirements of
5 arbitrary laws. And one main reason for this is that these
6 laws are oftentimes complex. And even human lawyers and
7 judges may disagree over what these laws mean and whether --

8 **THE COURT:** You're not suggesting that there's no
9 value to human review, are you?

10 **THE WITNESS:** No, I'm not. Instead, what I'm
11 suggesting is that the benefit of human review is marginal at
12 best for a variety of reasons I can go into now or discuss
13 later.

14 **THE COURT:** All right. Assuming that we get to it.
15 If not, we'll come back.

16 **THE WITNESS:** Okay.

17 **BY MR. CLARKE:**

18 **Q.** So Professor Mickens, I believe you testified that your
19 bottom line conclusion here was that the app review security
20 layers provide minimal additional benefits beyond what's
21 already enforced by the operating system; is that correct?

22 **A.** That is correct.

23 **Q.** Have you been following the trial proceedings these past
24 two weeks?

25 **A.** I've followed some of it, yes.

1 Q. Have you read or heard any testimony that you view as
2 relevant to that conclusion?

3 A. I have, yes. I've read transcripts of several pieces of
4 testimony that I think bolster the -- the conclusions that I'm
5 making here.

6 So, for example, Kosmyuka, who helped to run the review
7 process for Apple, he testified that the average amount of
8 time that is spent on an app review is I believe six to
9 12 minutes. Six to 12 minutes is not a very long amount of
10 time.

11 And what that means is that if you are someone who's
12 trying to slip something past the app review, the human aspect
13 of it, you only have to get that app to look like it's
14 legitimate for six to 12 minutes on average before it will
15 pass through that human aspect of the app review.

16 So that's one piece of testimony that buttresses my
17 opinion.

18 MR. LO: Your Honor, excuse me. This is outside the
19 scope of the report. The internal processes of app review
20 were not considered within the report.

21 THE COURT: The human -- the human processes were not
22 considered in his report?

23 MR. CLARKE: Your Honor, perhaps I can --

24 THE COURT: Just point me to the paragraph of his
25 direct testimony where he talks about human review.

1 **MR. CLARKE:** So, Your Honor, he -- he reviewed the
2 guidelines. He was not able to access internal documents
3 related to the internal processes of human review. This is
4 just testimony that supports his ultimate conclusion which was
5 disclosed in the report.

6 **THE COURT:** Could you answer my question and point me
7 to the paragraph?

8 **MR. CLARKE:** Yes, Your Honor.

9 So Professor Mickens written direct report, page --
10 paragraph 67. I believe Professor Mickens explains --

11 **THE COURT:** Just let me read it, counsel.

12 **MR. CLARKE:** All right.

13 (Pause in the proceedings.)

14 **THE COURT:** Okay. Well, that doesn't do it. I see
15 where legal compliance finishes at 76.

16 What he just said is not all that remarkable. Why don't
17 you move on. I'm not seeing anything beyond that.

18 **MR. CLARKE:** Sure. Thank you, Your Honor. We'll
19 move on.

20 **THE WITNESS:** Okay -- so that was one piece of.

21 **THE COURT:** No. Why don't you just -- he's going to
22 ask you a new question.

23 **THE WITNESS:** Oh, okay. Excuse me.

24 **MR. CLARKE:** Thank you.

25 **Q.** So Professor Mickens, is the App Store the only way that

1 apps can be distributed on an iPhone?

2 **A.** No, it is not. So there are --

3 (Demonstrative published.)

4 **THE WITNESS:** -- several additional distribution
5 channels, two additional ones of which I discuss in this
6 demonstrative that we see here.

7 So we just talked about the Apple App Store mechanism for
8 distributing apps. That's the one that's the best known to
9 layperson users.

10 However, there are a variety of additional models that can
11 be used on an iPhone. So, for example, that one in the
12 middle, the Enterprise Program. This model basically allows
13 an enterprise to act as a distribution hub for applications
14 that are distributed to the iPhones of employees for that
15 business.

16 So, here, the basic idea is that the enterprise first has
17 to go Apple and has to register with the Enterprise Program.
18 If Apple agrees to let the enterprise into the program, then
19 the enterprise can then allow its own internal developers to
20 create apps, to sign apps, and these apps are going to be
21 signed by the enterprise developers, not by Apple. That's a
22 difference between this program and the app store program.

23 And then those apps that were created by the enterprise
24 developer can then be distributed via in-house mechanisms. So
25 in other words, the enterprise itself can have a server, for

1 example, that distributes those apps directly to enterprise
2 iPhones.

3 And so what we see in this model is that we see a
4 difference in how apps are signed and how apps are reviewed.
5 So in this distribution channel, apps are signed by enterprise
6 developers. They're not signed ultimately by Apple before
7 they're distributed to end user machines. And also apps are
8 not centrally reviewed by Apple as they are in the App Store
9 program.

10 Now, if we look at that distribution channel off to the
11 right, that's an internal distribution channel that's intended
12 for use by Apple internal engineers. So the basic idea here
13 is that if these engineers are trying to, you know, test
14 various aspects of iOS, then they don't want to be hassled by
15 the burden of having to get all of these test apps signed and
16 then reviewed. That just slows down the engineering process.

17 So in this distribution channel, an Apple engineer can
18 install and execute an app that hasn't been signed by anyone
19 and that hasn't been centrally reviewed by Apple.

20 **BY MR. CLARKE:**

21 **Q.** So Professor Mickens, what is the significance of these
22 other distribution channels to your opinions in this case?

23 **A.** The significance is shown on this demonstrative that we
24 see here.

25 (Demonstrative published.)

1 **THE WITNESS:** So what we're seeing here is that each
2 row is a different kind of distribution channel. So the App
3 Store, the Enterprise Program, and the internal Apple testing
4 distribution program.

5 Now what we see is that off to the right, sort of those
6 blue sets of boxes, we see that each of these three app
7 distribution channels has a different approach towards whether
8 apps are reviewed by Apple to developer identification. In
9 other words, who gets to pick which developers can use this
10 distribution channel.

11 And these different models also have a different approach
12 towards code signing. Are applications signed, if at all, and
13 if so, by whom?

14 And so what we see is that despite the differences in that
15 blue side of table, the checkmarks and the X's and the
16 partially's and the not-by-Apples we see that for all three of
17 these distribution channels, we still have checkmarks in the
18 column that says on-device security as enforced by the
19 operating system.

20 And so this is very important because what this shows is
21 that already iOS supports multiple distribution channels.
22 This is already the case.

23 And furthermore, in these distribution channels, these
24 on-device security mechanisms are still enforced. And so this
25 is quite relevant when it comes to this idea of a third-party

1 app store because you can imagine that if we were to allow a
2 third-party app store on the iPhone, it might have some
3 different checks and X's and so on and so forth on the
4 right-hand side of the table, but it could still have that
5 green check when we look at on-device security mechanisms
6 enforced by the operating system.

7 **BY MR. CLARKE:**

8 **Q.** Professor Mickens, have you also evaluated the Mac OS as
9 part of your assignment in this case?

10 **A.** I have.

11 **Q.** And what is Mac OS?

12 **A.** Mac OS is the operating system that Apple has designed for
13 its laptops and its desktops.

14 **Q.** And how do apps get onto a Mac OS device?

15 **A.** So at a high level, there are three different distribution
16 chance for a Mac OS device, as shown in this demonstrative.

17 (Demonstrative published.)

18 **THE WITNESS:** So first we have the Mac App Store
19 channel. This is very similar in spirit to the iOS App Store
20 channel on iPhones. Essentially developers must be registered
21 with Apple. Once they are registered, they design their apps
22 for Mac OS. They upload a signed version of them to the Mac
23 App Store review process. If the app passes the review
24 process, Apple then redistributes the app via the official App
25 Store, but now it's signed by Apple, not by the individual

1 developer.

2 So that's one model for app distribution on Mac OS.

3 Now there are two other ones. Look at the one in the
4 middle. That's third-party distribution with Notarization.
5 So what this means is that, well, developers still have to be
6 known to Apple so they still have to register with Apple's
7 developer program. But now, when the developer wants to
8 distribute their app, they submit it to Apple for the purposes
9 of Notarization, not for a full review.

10 And so at a high level, you can think of Notarization as
11 just being a malware scan. So Apple looks at the app, checks
12 to see if there's any malware in there that is known to Apple.
13 If the answer is no, then Apple essentially generates a -- a
14 signed message which says that we, Apple, didn't find any
15 malware in this app.

16 And now, the third party developer is free to distribute
17 this app, which is signed by the developer, not by Apple, via
18 a distribution channel of the developer's choosing. So in
19 other words, in this model, apps are signed by the developer,
20 they're not signed by Apple, and the review process is
21 minimal. It essentially only just checks for malware in the
22 app.

23 **THE COURT:** In your industry, is the iOS viewed as a
24 stronger operating system than the Mac OS?

25 **THE WITNESS:** How are you defining stronger?

1 **THE COURT:** More secure.

2 **THE WITNESS:** I think there's a diversity of opinions
3 on that. I mean certainly, if you talk to Google people they
4 wouldn't agree. I think in my expert opinion, and I sort of
5 touch on this in my report and my direct written testimony, I
6 think that there is rough equivalence in terms of security
7 between iOS and Android.

8 **THE COURT:** No, I said iOS and Mac OS.

9 **THE WITNESS:** Oh, excuse me.

10 **THE COURT:** Not Android.

11 **THE WITNESS:** Sorry. Okay.

12 So -- so the question would I say that iOS and Mac OS are
13 in the same rough --

14 **THE COURT:** Is iOS more secure than Mac OS?

15 **THE WITNESS:** I would not say it is meaningfully more
16 secure.

17 **THE COURT:** Go ahead.

18 **THE WITNESS:** Okay.

19 **BY MR. CLARKE:**

20 **Q.** Professor Mickens, I think that you were describing the
21 third-party distribution with Notarization channel that
22 appears here. Could you just briefly summarize third-party
23 distribution as it appears in the far right-hand column of
24 this demonstrative?

25 **A.** Yes.

1 So what we see all the way off to the right is a
2 distribution channel by which apps are not reviewed and
3 furthermore they're not even notarized. And so in this
4 distribution channel, when an app arrives on a user device, it
5 is unsigned or it's signed by someone that Apple is not aware
6 of. And it's also not reviewed. And it's not even checked
7 for malware by Apple. And so this is a distribution channel
8 that is allowed by Apple today. It allows this form of app to
9 arrive on a user device.

10 **Q.** Professor Mickens, are Mac -- are Mac OS and iOS
11 completely different operating systems?

12 **A.** They aren't actually. If you look at how they're
13 structured from the engineering perspective, then what you see
14 as shown in this demonstrative --

15 (Demonstrative published.)

16 **THE WITNESS:** -- is that iOS and Mac OS share
17 critical infrastructure, critical plumbing.

18 **THE COURT:** I'm sorry. Professor, do you have -- did
19 you review the Apple data? I --

20 **THE WITNESS:** To determine...?

21 **THE COURT:** Did you review proprietary information to
22 reach these conclusions, or is this your outside view opinion?

23 **THE WITNESS:** I viewed no confidential Apple
24 information. Now, for example, with respect to this
25 demonstrative, you know, how did I come up with this? So --

1 **THE COURT:** The reason I'm asking --

2 **THE WITNESS:** I'm sorry.

3 **THE COURT:** -- is because I haven't heard from Apple.

4 So if Apple's experts who write the code or whatever, come
5 in --

6 **THE WITNESS:** Sure.

7 **THE COURT:** -- and say these systems are different,
8 I -- I take it then you wouldn't necessarily have a basis to
9 disagree because you haven't seen their proprietary
10 information; is that right?

11 **THE WITNESS:** No. I wouldn't agree that. And here's
12 why. Because if we look, for example, at this diagram here,
13 there's that part that says OS kernel Darwin, that's a kernel
14 that's shared by both iOS and Mac OS, and that's open source.

15 **THE COURT:** Okay.

16 **THE WITNESS:** So I have looked at that. That's
17 publicly known that, like, that's a thing that exists.

18 **THE COURT:** Okay.

19 **THE WITNESS:** So I've looked at that personally.

20 Now when you look at the middleware layers, so you see
21 like in that dotted box, there's some middleware that's shared
22 by both OS's, there's some that's not.

23 So how do I know that? How do I know that that stuff
24 exists? Well, there are books that exist, some of them which
25 I believe were written by people who work at Apple who talk

1 about this. And furthermore, there are people who
2 reverse-engineer things who have provided evidence that this
3 structure that we see here is in fact the structure that is
4 one that exists.

5 And in fact, there has been testimony here during this
6 trial from people who worked at Apple who have spoken to the
7 fact that these two operating systems share core components.

8 **THE COURT:** But -- but they're not -- okay. That's
9 fine.

10 Continue.

11 **BY MR. CLARKE:**

12 **Q.** So Professor Mickens, I think that you were explaining the
13 shared components that appear on this demonstrative. Could
14 you just explain the remaining layers that you hadn't
15 addressed?

16 **A.** Yes. So as we kind of just discussed, this is an OS
17 kernel that is shared between both iOS and Mac OS. That's
18 open source. Its name is Darwin. There's also a set of
19 middleware which is shared between iOS and Mac OS.

20 So what does this shared OS functionality do? Well, it's
21 responsible for implementing some of the lowest level
22 management tasks on the device. But perhaps more importantly
23 for this case, that shared OS functionality is responsible for
24 enforcing many of the core OS-based security mechanisms. So
25 for example, memory protection and things like that.

1 It's also responsible for providing the infrastructure,
2 the plumbing that makes sandboxing possible. So that's what
3 those shared functionality pieces do.

4 Now, if we go one row up in the demonstrative, we see that
5 there is middleware, OS middleware, some of which is specific
6 to iOS and to Mac OS.

7 Now the reason why some of that differs is because, for
8 example, you know, an iOS has a different user interface based
9 on a touch screen in comparison to a Mac OS. So you need some
10 different OS code to deal with that kind of stuff.

11 You also have some specific middleware on the two
12 platforms for customizing some of those core OS level security
13 features, and in particular to help to implement some of these
14 different distribution channels that we see on the two
15 platforms.

16 **Q.** So, Professor Mickens, could you explain to the Court how
17 security gets enforced on Mac OS?

18 **A.** Yes. So if we look at this demonstrative, what am I
19 showing here?

20 (Demonstrative published.)

21 **THE WITNESS:** Well, I'm showing, for both iOS and
22 Mac OS, the shared set of functionality in the operating
23 system that provides on-device security. That's what we're
24 seeing at the bottom sort of in the green.

25 And so we've looked at a version of this slide before when

1 I was talking about how security is enforced on iOS. And so
2 what I want to call your attention to here is that if we look
3 at the bottom layer in the green, we see a lot of overlap
4 between these various ovals. We see a lot of security
5 mechanisms, in other words, that are provided by both iOS and
6 Mac OS.

7 Why is there that overlap there? Well, I explained that
8 on the previous slide. It's because iOS and Mac OS share the
9 same kernel and a lot of their middleware.

10 So if we look at the top in the blue, here we see those
11 off-device security mechanisms. These are the things that are
12 sort of involved with implementing various policies for
13 different distribution channels.

14 And so what we see is that on both iOS and Mac OS, there
15 is support for code signing, although not all distribution
16 channels require that on these two platforms. On both of the
17 platforms, there is support for developer identification,
18 although the two platforms have application channels that may
19 implement that in different ways. And then furthermore, in
20 both platforms you have support for app review, although not
21 all distribution channels on these two platforms use that.

22 So these are the sort of common pieces of functionality.

23 **BY MR. CLARKE:**

24 **Q.** So, Professor Mickens, does Mac OS do anything differently
25 to ensure security from iOS?

1 **A.** It does. So if we go to the next demonstrative, what we
2 show here are some of the features that are currently unique
3 to Mac OS --

4 (Demonstrative published.)

5 **THE WITNESS:** -- although I believe that they could
6 be implemented on iOS with minimal engineering effort because
7 there's so much shared plumbing between the two platforms.

8 So if we look up at the top right, we see on the Mac OS
9 side there's this Notarization oval, this new Notarization
10 oval. That's basically the part of the Mac distribution model
11 that deals with running that malware scan on the server side
12 and then making sure that Apple can produce that signed
13 message saying we found no malware here.

14 So that part's currently not implemented on iOS for
15 off-device security, although like I mentioned, I think that
16 it could.

17 Now if we look at the --

18 **THE COURT:** But they'd have to create it new?

19 **THE WITNESS:** What do you mean by create it new?

20 **THE COURT:** That is they'd have to write code for the
21 mobile device.

22 **THE WITNESS:** I believe that the amount of code that
23 would have to be written is actually quite minimal. And the
24 reason is because, you know -- and I sound like a broken
25 record perhaps at this point -- if we look at the green part

1 in the bottom, we see a bunch of common security mechanisms.

2 And in fact, can we go to the next demonstrative, please.

3 (Demonstrative published.)

4 **THE WITNESS:** So this is sort of a natural place to
5 talk about this.

6 So if we look at this demonstrative, what it's showing is
7 that on the left, I believe that you could actually take these
8 models and move them to the iOS. And so if you look at that
9 green part, at the bottom, you see that there are components
10 that are on Mac OS, like Gatekeeper, like malware scanners,
11 like the Notarization, that I'm showing sort of having these
12 arrows coming to preexisting green parts, those are the pieces
13 of technical plumbing that I think would allow those features
14 from Mac OS to be brought over to iOS.

15 So I got a little bit ahead of myself, but I wanted to
16 just have this up when we were having this conversation.

17 Let me tell you specifically what Gatekeeper malware
18 scanners do. So specifically what the malware scanners do on
19 Mac OS is that they essentially look to try to see if
20 malicious code has gotten onto the device and, if so, they try
21 to get rid of it.

22 So do these malware scanners currently exist on iOS? Not
23 currently. Do I think that they could? I think the answer is
24 yes. Because if you look at the plumbing, the infrastructure
25 from the operating system that is needed to implement these

1 features, it's all there. It's all those green boxes that are
2 shared across both platforms.

3 Now, if you look on the right in Mac OS, there's this
4 thing called Gatekeeper that you may have heard about earlier.
5 What is Gatekeeper? Gatekeeper is basically a program that
6 runs on Mac OS, and at a high level, when you try to install
7 an application, Gatekeeper looks at the signature and tries to
8 determine which application distribution model it came from.
9 Did it come from the Mac OS store? Which means that it's
10 going to be signed by Apple. Did it come from the
11 Notarization model? Which means that the app will be signed
12 by developer known to Apple. Or did it come from that third
13 channel?

14 And then depending on the signature that Gatekeeper finds,
15 it may prompt the user to say something like, oh, this app was
16 notarized, but you haven't allowed notarized apps. Or, you
17 know, this app wasn't signed by anyone. Do you want that type
18 of application to be installed?

19 So Gatekeeper essentially looks at signatures and then
20 executes a policy. So why do I show that being capable of
21 being implemented on iOS? Because how do you check
22 signatures? Well, you need operating system support to allow
23 the signature in a piece of digital content to be found. And,
24 aha, that's -- that's on iOS. That's part of that shared OS
25 functionality that both iOS and Mac OS have.

1 So this is why I think that, for example, if we wanted to
2 take the Notarization model and port it, you know, sort of use
3 it on iOS, that's why I think that it's possible.

4 **BY MR. CLARKE:**

5 **Q.** And Professor Mickens, your discussion there you focused
6 on Notarization and Gatekeeper. Just for completeness sake, I
7 see that malware scanners are listed here too. I take it you
8 have the same opinion with respect to malware scanners?

9 **A.** Yes, that's right. And so malware scanners, you can think
10 of those as essentially being pieces of -- of code that
11 examine app behavior and try to figure out if that behavior is
12 malicious.

13 And malware scanners can also be implemented on iOS
14 because there is that same shared support across both OS's for
15 doing behavioral introspection through the sandboxing
16 introspection layer.

17 **Q.** Professor Mickens, if Apple were to allow users to access
18 apps through channels outside of the App Store, how, in your
19 opinion, would that impact users' security experience?

20 **A.** I don't think that it would have a meaningful difference
21 on the security experience.

22 **Q.** So, Professor Mickens, can you walk us through the
23 implications of the various app distribution channels that
24 you've discussed on both iOS and Mac OS today?

25 **A.** Yes, I can. So if we look at the next demonstrative, then

1 what we show here is now I'm showing you all six application
2 distribution channels that we've talked about today.

3 (Demonstrative published.)

4 **THE WITNESS:** So each row is a channel. We're
5 looking at the channels that I've talked about for iOS and for
6 Mac OS.

7 Now, what we see is that for all of these different
8 distribution channels, all of which are supported, I want to
9 say, in today's world so already these operating systems are
10 capable of supporting multiple distribution channels, what we
11 see is that for each one of these channels, if we look at sort
12 of the columns off to the right, so apps reviewed by Apple,
13 apps signed by, then we see a diversity of text in those
14 particular columns.

15 In some cases, apps are reviewed centrally by Apple. In
16 some cases, they're not. In some cases, they are but it's
17 only a malware scan. Similarly if we look at the apps signed
18 by column, we see diversity there as well. In some cases,
19 apps are signed by Apple. In some cases, they're signed by
20 enterprise developers. In some cases, by third party
21 developers. Or not at all in some cases. So we see diversity
22 on that side of the table.

23 Ah, but what do we see in the on-device OS security
24 features column? We see yeses all the way down.

25 So what does that mean? That means that regardless of the

1 distribution channel that is being used to get apps onto an
2 Apple device, at least in these six models that we're looking
3 at, all of the on-device OS security features, memory
4 protection, sandboxing, so on and so forth, they're all
5 enforced.

6 And so the importance of this chart is severalfold.

7 First of all, it shows that empirically Apple devices
8 already support multiple distribution channels.

9 Second, it shows that in those channels, the on-device
10 security features provided by the OS are still enforced. And
11 what this means is that if iOS was opened up to third-party
12 distribution channels, you could imagine adding another row to
13 this table where maybe we have, you know, a different set of
14 yeses or noes on those last two columns, but we still have a
15 yes in the on-device OS security feature column.

16 **BY MR. CLARKE:**

17 **Q.** Professor Mickens, are the distribution channels that
18 appear on this chart mutually exclusive?

19 **A.** They are not. And this is another important thing to keep
20 in mind. So, for example, if we look at the way that the
21 Mac OS world currently operates today, this is not an act of
22 imagination, you could imagine that some users might only want
23 to download apps from the Mac store. And that's fine.
24 That's -- that's allowable today.

25 You could imagine also a different user who, for whatever

1 reason, only wants to install apps that are notarized but that
2 don't go through the central Mac store. That's also possible
3 too. The user could maybe want to use both. So on and so
4 forth.

5 And so why is this so critical to this case? It's because
6 if iOS were opened up to third-party app stores, that would
7 not, for example, prevent users from using the regular app
8 store. It would not in any way encroach on Apple's ability to
9 perform reviews for apps that come through the central app
10 store process.

11 These things can coexist and users can choose which
12 channel or channels they want to use to download and install
13 apps.

14 **Q.** Professor Mickens, would opening up app distribution on
15 iOS mean that Apple would have to stop performing app review
16 on iOS?

17 **A.** No. And this is a really critical point to make, that if
18 iOS were opened up to these additional channels, the app store
19 wouldn't have to be changed at all. Apple could still use
20 whatever internal processes it has to scan for malware, to
21 look for, you know, desired esthetic qualities for apps.

22 There's no reason that Apple couldn't keep doing that today.

23 And we already see, as I kind of alluded to earlier, that,
24 you know, at least on Mac OS, a layperson user already has
25 access to multiple distribution channels, none of which

1 impinge on Apple's ability to perform the review process as it
2 sees fit.

3 **Q.** Professor Mickens, would implementing any of these
4 alternative distribution channels on iOS make the iPhone any
5 less secure than the Mac OS, in your opinion?

6 **A.** I don't believe so, no.

7 **Q.** Professor Mickens, at the beginning of your testimony, or
8 early in your testimony today, the Court asked you a question
9 about Android. Do you recall that?

10 **A.** Yes.

11 **Q.** Now, your testimony today has focused heavily on Mac OS,
12 not Android; is that correct?

13 **A.** That's correct.

14 **Q.** And why have you focused on Mac OS and not Android in your
15 discussion?

16 **A.** Well, because I think that if you look at Mac OS and iOS,
17 these are two operating systems, although they share important
18 pieces of functionality, but these are two operating systems
19 which Apple itself has written, which Apple itself has
20 advertised as being extremely secure.

21 But when we look at this chart, this demonstrative, what
22 we see is that Mac OS, which is touted by Apple in public
23 facing documentation as providing a very secure experience, we
24 see that it allows a variety of distribution channels in which
25 apps may not be fully reviewed by Apple or reviewed at all.

1 And yet Apple says, once again in public facing
2 documentation that anyone can see on their website and in
3 their commercials, they say that Mac OS is secure.

4 And so that's why the comparison between and iOS and
5 Mac OS is so important. Because let's even say that we -- we
6 think that Android somehow is radically less secure. Well,
7 let's just look at iOS versus Mac OS, two products that Apple
8 itself has made, two products that Apple itself says are
9 secure, but two products of which support a variety of
10 application distribution channels with some very different
11 properties. And yet all of those distribution channels still
12 enforce the on-device OS security features.

13 **MR. CLARKE:** Your Honor, no further questions.

14 **THE COURT:** Do you know how many people fall into
15 this third-party developer category that you have for Mac OS?

16 **THE WITNESS:** No. I don't know the fraction of, you
17 know, all Mac programs.

18 **THE COURT:** Do you have a ballpark?

19 **THE WITNESS:** I don't have statistics. I wouldn't
20 know.

21 **THE COURT:** Do you know how many apps are on the
22 iPhone?

23 **THE WITNESS:** No. I don't have direct knowledge of
24 that, no.

25 **THE COURT:** Would it make a difference to your

1 analysis if the, you know, third-party developer number was so
2 small that it could be easily managed as opposed to having to
3 deal with hundreds of thousands of apps that went through this
4 process?

5 **THE WITNESS:** So what do you mean by "managed"?

6 **THE COURT:** Well, if you know who the third party
7 developers are, you have a relationship.

8 **THE WITNESS:** Um-hmm.

9 **THE COURT:** And so if anything happens, you know who
10 to go to as opposed to having hundreds of thousands of
11 developers out there throwing things onto your device, would
12 that make a difference?

13 **THE WITNESS:** Well, I think that -- it's a -- it's a
14 subtle and complex topic.

15 The reason why I say that is because fundamentally, you
16 know, what determines whether an application is malicious.
17 Well, as I've opined at several points in the testimony, it's
18 behavior.

19 So let's imagine we had a world, the one I think you were
20 envisioning -- correct me if I'm wrong -- where the
21 third-party app store universe was so small that the
22 third-party app store manager, whoever that happens to be,
23 would have like an individual relationship with the developers
24 somehow. So that if something went wrong, you know, the
25 third-party app store manager could go to that developer and

1 says, you know, tsk, tsk, you know, don't do that kind of
2 stuff, or punish that person in some way.

3 Even if we were in that world, you would still want to
4 provide client-side OS security mechanisms because you need
5 insurance. That's almost like the way to think about this.
6 You know, you have to sort of hope for the best, but plan for
7 the worst.

8 And so in fact this is one of the reasons why. If you
9 look at, you know, the variety of distribution channels that
10 these -- these Apple devices support currently, they all still
11 support that -- those basic OS level security mechanisms.

12 **THE COURT:** But in planning for the worst, could it
13 be that these third-party developer numbers are so small that
14 that's an acceptable risk as opposed to opening it up so wide
15 that you're now dealing with hundreds of thousands, if not
16 millions, of inputs, and so that risk --

17 **THE WITNESS:** Um-hmm.

18 **THE COURT:** -- is not necessarily a risk that is
19 worth taking.

20 **THE WITNESS:** Well, I think that your question is
21 touching on, at least implicitly, this issue of scalability.
22 Because I think that when you look at, you know, how do we
23 define risk, or like, for example, why do I think that the app
24 review as currently instituted doesn't provide huge marginal
25 security benefits. Part of that challenge is scalability.

1 You know, so if you do have a very large app universe, it can
2 be difficult to, you know, find enough human reviewers with
3 enough time to look at them all.

4 **THE COURT:** But your analysis, though, doesn't really
5 deal with that scalability issue then.

6 **THE WITNESS:** My analysis -- so -- so when I say
7 things like in my expert report, when I say things like the
8 app review provides marginal additional benefit, right, that's
9 something that I think at least implicitly several pieces of
10 Apple testimony have agreed with, inasmuch as when Kosmyinka
11 says -- sorry, I won't mention that.

12 **THE COURT:** That's okay. I'm really more focused
13 on -- on yours as opposed to the -- the human aspect. I mean
14 this -- you've made a big point about this third-party access.
15 All I'm trying to understand is whether you've done any real
16 analysis in terms of the numbers that get implicated, and it
17 sounds like the answer to that question is no.

18 **THE WITNESS:** Yeah, if I understand -- let me take
19 one more crack at trying to understand what you're saying.

20 So there are parts of an app store operation that involve
21 scalability issues. There are parts that do not. So when we
22 look at those on-device client side security mechanisms, those
23 mechanisms can be implemented sort of regardless of the volume
24 of the apps that a third-party app store would have to review.

25 Because basically you design those, you know, OS-based

1 security mechanisms once, and then they just kind of work for
2 any type of app that shows up on a machine.

3 Now, when you look at the human driven aspect of it, and
4 that's where I was sort of coming back to that earlier, that
5 part is more difficult to scale. And so it is true that in
6 a -- in a third-party app that had fewer apps, there would be
7 less of a concern with the human scalability aspect of it.

8 But I don't think that that is sort of sufficient to open
9 up sort of a world of -- of abject and total security horror
10 if you were to enable a third-party app store.

11 **THE COURT:** And at this point that last statement,
12 though, is a qualitative statement as opposed to a
13 quantitative statement.

14 **THE WITNESS:** The statement about?

15 **THE COURT:** Your last statement about measuring risk.

16 **THE WITNESS:** Yes, and so I think that's something
17 that can be a bit frustrating sometimes even for security
18 researchers, which is that we want to get these quantitative
19 numbers, we want to be able to say sort of intuitively, oh,
20 this platform is, you know, four times more secure than
21 another one. But those numbers are oftentimes impossible to
22 provide.

23 **THE COURT:** My earlier questions to you were
24 generated by an *MIT Technology Review* article that came out a
25 couple months ago talking about the Apple iPhone operating

1 system as opposed to a number of the others and how that one
2 seems to be much more secure but on the iOS part of it. You
3 didn't happen to read that article, did you?

4 **THE WITNESS:** I -- I believe I did. I believe I did
5 see that article.

6 I think there are a couple things to keep in mind there.
7 I think that sort of as I discussed in my expert witness
8 report, I think that there is rough parity in terms of the
9 security of various pop or commodity operating systems. And I
10 give some reasons for that in the report.

11 As a very quick summary, one reason is that I think that
12 when you look at the engineering cultures for all of the sort
13 of large-scale software vendors now, not just Apple,
14 Microsoft, Google, so on and so forth, they try to create a
15 culture of security.

16 This may not have always been true, but I think it's true
17 now. And I think the evidence of that empirically is that if
18 you look at the security techniques that are employed by all
19 the commodity operating systems, Mac OS, Windows, Android, so
20 on and so forth, you're seeing this convergence. You know, it
21 seems like the industry, the sets of people who make these
22 operating systems, have sort of come to similar conclusions
23 about what makes a system secure.

24 And so I think that, you know, those are reasons that I
25 believe that there is this rough equivalence in the security

1 of all these commodity platforms.

2 **THE COURT:** Okay. Thank you.

3 **THE WITNESS:** Thank you.

4 **THE COURT:** Well, we won't get you back to
5 Massachusetts. We're at the end of our day. I suspect that
6 they will be prepping you for your cross-examination, but
7 maybe you can make it to the wine country or something.
8 Couple of hours.

9 **THE WITNESS:** I'll tell them the Judge sent me.

10 **THE COURT:** All right. Ladies and gentlemen, or I
11 should just say counsel, anything that we need to do before we
12 adjourn for the weekend?

13 **MS. FORREST:** No, Your Honor, not from us.

14 **MR. DOREN:** No, Your Honor.

15 **THE COURT:** Okay. Then we will stand in recess until
16 8:00 a.m. on Monday. Everybody have a good weekend. We'll
17 see you then.

18 Thank you.

19 **THE WITNESS:** Thank you.

20 (Proceedings were concluded at 3:23 P.M.)

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CERTIFICATE OF REPORTERS

We, Diane E. Skillman, Pamela Batalo-Hebel, and Raynee Mercado certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter. We further certify that we are neither counsel for, related to, nor employed by any of the parties to the action in which this hearing was taken, and further that we are not financially nor otherwise interested in the outcome of the action.

_____/S/DIANE E. SKILLMAN_____

Diane E. Skillman, CSR, RPR, FCRR

_____/S/ PAMELA BATALO-HEBEL_____

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_____/s/ Raynee Mercado_____

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Saturday, May 15, 2021